



AGRICULTURAL RESEARCH INSTITUTE

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BEING

THE JOURNAL

OF

The Royal Agricultural & Commercial

Society

OF

BRITISH GUIANA.

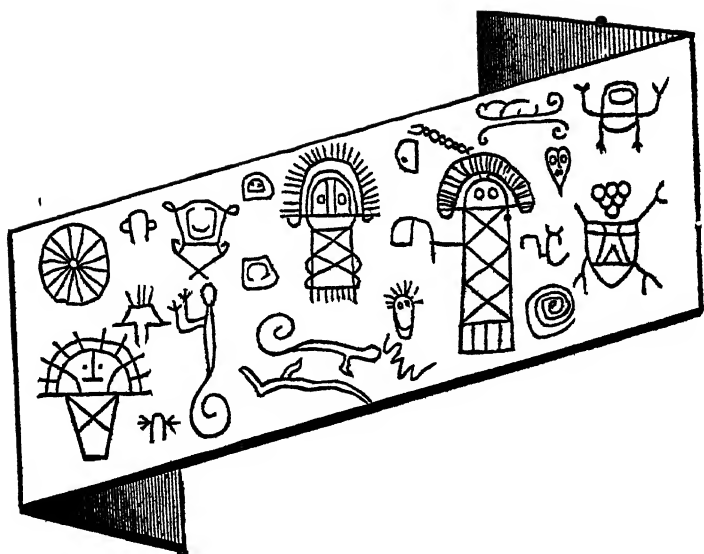
Edited by J. J. QUELCH, B. Sc., Lond.

Vol. II. (New Series) 1888.



Demerara : J. THOMSON, 1888.

London Agent : E. STANFORD, 26 & 27 Cockspur Street
London.



PRINTED AT THE "ARGOSY" OFFICE, DEMERARA.

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Our Criminal Classes.

By Henry Kirke, M A., B.C.L., Oxon., Sheriff of Demerara.

CRIMES are serious offences punishable by the laws of a community, and are not to be, as they often are, confounded with sins. A sinner is one who breaks the laws of GOD, or rather those laws as interpreted by the particular religious sect to which he belongs. Bigamy is both a crime and a sin in England, but in Mahommedan countries it is a virtuous condition of life. Adultery in England is a sin but not a crime, whereas by Hindu law it is both.

Criminals are persons who break the public laws of the country in which they reside or of the community to which they belong, so that any person residing in British Guiana, from whatever country he may have come, is liable to punishment for a breach of the laws of the colony, even although he may be entirely ignorant of those laws, and had been brought up under a system entirely different. It is this ignorance which leads to a class of crime amongst our East Indian immigrant population to which I shall refer later on.

Without law there can be no crime, so in those countries where civilization has reached its highest perfection and where innumerable industries and luxuries require proportionately numerous laws for their protection and development, we should expect to find the greatest

amount of crime. And this would be so if it were not that side by side with this advanced luxury and wealth there also springs up a philanthropic sentiment, a desire to mitigate and assuage the miseries of the poorer classes, a development of education, of self control, a feeling of responsibility and love of order, which more than counteracts the criminal opportunities above alluded to. It is in societies such as our own which are, as it were, in a transitional state, having a dark background of slavery and violence, an original substratum of convicts and refugees from justice, besides an imported population of turbulent and unquiet spirits from both hemispheres, that we may expect to find the greatest development of the criminal tendency.

It is said that every nation is differentiated in criminal statistics by its tendency to certain classes of crime. To any one studying the Criminal Records of this colony the truth of this statement is apparent. The Criminal Classes, as a rule, are drawn from the lowest and poorest section of the community. It is true that no one class has a monopoly of crime; the Medical man does sometimes poison his wife; the Clergyman at times embezzles the Church funds, a Captain of Dragoons may commit suicide or a Banker forgery, but $\frac{1}{100}$ ths of our criminals are drawn from the lowest stratum of society, and are the offspring of want, poverty, ignorance, and moral and material filth. All generalizations are dangerous, but still I think we may concede that murders and felonious assaults in this colony are mainly committed by East Indians and Chinese; larcenies by black and coloured Creoles; wounding with knives and razors principally by the Barbadian coloured people; forgeries

and embezzlements by partly educated coloured Creoles ; breaches of the revenue laws and cheating by Portuguese ; whereas perjury, bearing false witness, profane swearing and indecent language seem pretty evenly distributed amongst all classes of the community.

The amount of crime in this colony is something appalling. Taking the population at 270,000 I do not hesitate to say that the amount of detected crime is at least three times more than what is found in a population of a similar extent in Europe. In 1885, 2319 persons were committed to gaol after conviction, the population being estimated at 270,042 which gives us 1.97 per cent. of the population committed in one year. Now if we turn to the Criminal Statistics for England and Wales for the year 1886, we find that out of an estimated population of 27,870,586 the number of persons committed to prison for indictable offences and under summary conviction amounted to 179,324 or only .64 per cent. of the population.

The causes of this are not far to seek nor difficult to explain. In the first place our population is principally recruited by immigration, and our immigrants both from the East Indies, the West Indian Islands and China, are not the most quiet orderly and industrious of the population of those countries respectively. Secondly we have the inherited curse of slavery making our black population untruthful and dishonest ; in addition an inflaming temperature and a national drink of a highly intoxicating and noxious nature. One prevailing cause of crime amongst our East Indian immigrants is the scarcity of women, causing jealousy, assaults, and frequently murders to arise. An Indian kills his wife

when she deserts him for another man partly on account of jealousy and revenge but more often because he is angry at being robbed of his jewelry with which he had loaded her. By the Law as administered in this colony the jewelry given to the wife or mistress during cohabitation becomes her personal property and when she leaves her husband she takes it with her. Now in India, if a wife commits adultery or leaves her husband for any cause, her jewelry is stripped from off her, and remains her husband's property, so that if he loses his wife he does not lose his money which he generally values most.

This was pointed out to the Attorney General and he made some alterations in the Immigration Law by a recent Ordinance (No. 2 of 1887) to meet such cases. But that law in my opinion does not go half far enough. Every woman who leaves her husband should be compelled to deliver up to him all the jewelry which he has given to her ; and any man harbouring or enticing away a woman with her husband's jewelry in her possession should be liable to arrest as a thief together with the wife, as they would be in England, where if a man elopes with a married woman and some of her husband's towels are found in her box, he may be tried and convicted of theft.

Great hardship is inflicted by the laws of the colony upon Hindoos, who are a most conservative people, and who, although they change their country, are unable to divest themselves of their ancient faith and customs. The crimes of perjury and false-swearing are unknown to the Hindoos in the same sense as we understand them, and the necessity of telling the truth under all circumstances—so deeply engrafted in the constitution

of an Englishman—is to them a foolish superstition. The Hindoos have from remote ages lived in communities closely allied in blood, and under certain laws and obligations to each other, which, being of a sacred character, are considered more binding than any others. The women of a family are taught to be in entire submission to the head of the family whether he be her father, grandfather or the oldest agnate ; so that if her father or brother falls foul of the law it is a sacred duty for her to do everything in her power to assist that male relative. The mere telling of untruths before a Court of Justice would be as nothing in her eyes, whereas the neglecting or refusing to do so if a father's life or liberty were at stake would be a crime of the deepest dye which in olden times would have brought her to the stake or the rope. In my experience I have known several cases where Hindoo women have been sent to prison for perjury committed to rescue a father or a brother, and when I was sheriff of Essequibo I obtained the release of a woman who had been sentenced to two years imprisonment for such an offence by explaining the whole circumstance to Governor KORTRIGHT.

Want of education is one of the great factors in the manufacture of criminals: and when I say education I don't mean teaching the three Rs of which there is too much already in the colony, but education in the sense of teaching the people decency, cleanliness, modesty, honesty and thrift. It is impossible to expect respectable men and women to grow up out of the moral cesspools in which they are bred and reared. Let any one walk through the yards which lead out of Lower Regent Street, Lombard Street, or Leopold Street, and let him ask himself how he could

expect respectable law-abiding citizens to be raised therein. Rents in this city are very high, and there is a class of landlords who seem to think that their duty is only to wring out of their wretched tenants as much money as they can get and yet that they have no obligations to meet in return. It is a common thing to find the rent of one wretched room opening on to a yard full of slush and mud, undrained, permeated with foul odours, to be two dollars a month and more. To meet this sum the tenant takes in as many people to lodge with her as she can get, who pay her perhaps 1/ a week each; and so half a dozen people of both sexes and all ages sleep together in a place whose cubic capacity would hardly supply enough air for two adults. It is horrible to see, as I have seen, the dense population which exists in some of the yards I have mentioned. In such places, in such a manner of life, is it to be wondered at that all decency is openly disregarded, that the most violent rows, the most filthy language are the daily pabulum of the inhabitants both young and old. Surely the Corporation of Georgetown, composed as it is of practical, clear-headed and philanthropic men, should turn their attention to these foul cesspools, and insist that landlords should be compelled to make their yards and houses well drained and habitable, and should prevent the over-crowding of houses, by such regulations as are in force in the large towns of England. Surely some of our great planters and merchants who have made fortunes out of this colony might imitate on a smaller scale the noble PEABODY and erect some model lodging houses for our poor people. I could name six or seven gentlemen who have died within the last

twenty years whose accumulated fortunes amount to more than one and a half millions of pounds sterling and yet not one of them has left a cent for the benefit of the poor of the colony, though the whole of their great fortunes have been made here by the labour of the people. It is a shame and a disgrace! Two men only, PAUL DE SAFFON and SAMUEL BRANDFORD TROTMAN, have left charitable legacies to their poorer brethren, and their names will to all time be accompanied by the blessings of the widow and the fatherless.

One great object of education is to make the public understand that all crime is detrimental to their interests as members of a social state, and to make them disapprovers of criminals. Public disapprobation has a more deterrent effect in rooting out crime than any amount of legal punishment. If the people generally were distinctly hostile to offenders it would assist justice immeasurably in catching and punishing criminals. "An enlightened people are a better auxiliary to the judge than an army of policemen." But unfortunately amongst the poorer classes, public disapprobation of criminals, especially when they are thieves can hardly be said to exist: on the contrary if the victims be the richer classes, more sympathy is shown than disapprobation. They consider property as a benefit in which they have no share, and that the rich are the natural prey of the poor; so that instead of being an assistance to justice the lower classes throw every obstacle in the way of the suppression of crime, and the punishment of offenders. Even respectable people of the poorer classes who would themselves shrink from theft, will at the same time screen one of their own order who is pursued by the

officers of justice for an offence against property, rather than incur the opprobrium which in their class always attaches to the name of an informer.

Crime and immorality go often hand in hand. Not that immoral persons, that is persons who break what are called the Moral and Social Laws are necessarily criminals, but the practice of immorality in its broadest sense has a tendency to weaken the mental discrimination between what is evil and what is good, and so disintegrates the moral fibre of a man's constitution and makes him more susceptible of influences which tend to criminal expression. It is obvious that the herding together of people of all ages and both sexes in ill-ventilated and badly-drained rooms must tend to produce disease both of mind and body, disease of body by inhaling foul air, by contagion, by want of sufficient breathing space and other causes; disease of mind by contamination of the less depraved and younger people by the indecency and impurity both in words and actions of the more depraved and older. Similarly the unhealthy lives of a nation or colony may equally tend to produce a low ideal of social life which may weaken the moral fibre of its people to the results before mentioned. The marriage laws of this colony are of such a nature as to put a premium upon vice and concubinage, and to throw every obstacle in the way of early and virtuous connection between the sexes. The old Roman-Dutch Law which enables parties who have lived together in concubinage for years to marry and at the same time legitimate their children so as to place them in the same position legally as children born after marriage has been most fatal in its results upon female chastity.

Many young women belonging to respectable families, enter into a state of concubinage with an unmarried man with the hope and perhaps the promise that at some time their nuptials will be celebrated, who, if they knew that the children born of such a connection would be forever branded as bastards and they themselves be objects of scorn and contempt, would shrink from such a state of life. Very little disgrace attaches here to a woman who lives with one man in recognized concubinage so long as that man is sole and unmarried and able at any time to consummate their nuptials, but it is a matter of common observation that where the few maintain this relationship, which if rigidly kept is certainly not the most disgraceful life, intact, too frequently infidelity on the one side leads to jealousy and subsequent infidelity on the other ; illicit polyandry succeeds to the previous concubinage, and from polyandry to prostitution is under our institutions a step more distinguishable in name than in reality. That a vast number of our people in this colony live in a state of immorality, merely using that word with regard to the relation between the sexes, is unfortunately too true, as the number of illegitimate births in comparison with those born in wedlock clearly shows. At the same time, I think it is very unfair to class Hindoo and Mohammedan children as illegitimate whose parents have been married according to the tenets of their respective religions. These illegitimate children naturally grow up in a careless and neglected fashion if they live at all, surrounded by filth both mental and physical, and it is no wonder that the results are most unsatisfactory. It is well known to the City Magistrates and the Police that certain quarters of the city swarm with shameless

girls between the ages of 10 and 17, whose morals are those of a Yahoo, and whose language would disgrace a bargee. I said "if they live" for I have often heard the late Dr. MANGET say that three-fourths of the children under twelve months that die in this colony, are done to death by the ignorance, neglect or brutality of their parents. There can be no doubt that the prevalent relations of the sexes leads to a great development of infanticide; not perhaps the deliberate slaying of infants by violence, but the no less sure though more lingering death by starvation and neglect. Abortion too is extensively practised by a certain class of unmarried coloured women to whom children would be a trouble and disgrace.

Adulteration is another factor in the manufacture of criminals, being a fruitful cause of disease and drunkenness which are parents of crime. During my short tenure of office as Attorney-General I introduced an Ordinance to prevent adulteration, which became law as No. 11, 1882, but its provisions have never been carried out, and our labouring classes, the backbone of the country, are being poisoned by villainous mixtures sold in the retail Spirit Shops. The wealthier classes are not more favoured as the most filthy stuff is sold in some of our stores as butter or lard, whilst milk is delivered at our doors mixed with water to at least 30 per cent. of its bulk. Whilst the Commissariat enforces that the proper strength of the rum be maintained, it pays no attention to its purity. Rum in its natural state is the purest and most wholesome of drinkable spirits but under the hands of the Portuguese and Chinese shopkeepers it becomes a noxious and intoxicating compound.

It is the experience of all Judges and Magistrates that drunkenness is the cause of more than half of our crime, so that anything which may supply our population with a pure and wholesome drink in place of what they now consume, would be a step in the right direction for the diminution of crime.

These statements as to our criminal population may seem to some readers exaggerated, but I wish I could think they were. They are founded on the experience of 16 years on the Bench of this colony both as Judge and Magistrate. The prospect is dark enough, but the darkest hour of the night is the one before dawn, so we may look forward to a better time. Already during the last few years there had been a considerable diminution in the smaller offences, which are dealt with summarily by the Magistrates, and, although the Criminal Sessions still maintain their formidable dimensions, we may hope that at these also the Calendar may be reduced. The number of convicts in the Penal Settlement is smaller than usual and the prisoners in the Local Gaols are not so numerous as in former years. The discovery of gold in the S.W. of the colony has given a vent to many turbulent spirits, who were wasting their energies in making raids upon their fellow citizens.

It was said of AUGUSTUS CÆSAR that he found a city of brick and left it of marble. It may be said of our city Ædile that he found Georgetown built of wood and that he will leave it a city of cement. It would be well if his energies were directed for some time to the slums of this large and ever increasing city, so as to do something to remedy the condition of our poorer classes. If the existing Ordinances do not give sufficient authority

to the Health authorities to deal with undrained yards, leaking houses, rotten tenements unfit for human habitation, and lodging houses crowded to suffocation, then fresh powers should be obtained from the Government. But the best of Laws are of no avail unless they are put into force.

An attempt has been made of late years to check the increase of crime by the reformation of juvenile criminals. The Industrial School at Onderneeming has been opened since 1879 and has certainly been in one way a great success; but I very much doubt whether the boys are in many instances trained from crime. Too frequently we find them falling back into their old courses, mingling with their old associates and entering into a bolder and more reckless career of vice and crime, ending too often in a convict cell at Massaruni. Where numbers of bad boys are brought together they mutually contaminate each other; the morale of the school is very low, and although everything is done to teach the boys decency, industry and morality, very few I fear practise them when away from their master's eyes. It is a pity and a mistake that when a boy is discharged from the Industrial School he is taken by the police in custody to his native place, and sometimes *en route* is detained in a Police Station for some hours. When finally discharged this police restraint leaves a sort of criminal taint on the boy, which it is difficult for him to shake off. The boys should leave the school at 16 years of age and be apprenticed to any respectable person willing to take them for two years, during which time they might be more or less under the control of the Superintendent and should be encouraged to appeal to him in any diffi-

culty and to look to him in after life for help and encouragement. I am sure the present excellent Superintendent of the Onderneeming School would be only too glad to do what he could to assist his boys to gain an honest livelihood and a respectable name.

The Girls' Reformatory which it is proposed to establish, offers still greater difficulties than the other. Amongst the abandoned young women who would form its inmates it would seem impossible to hope that any blossom of purity or industry could survive. At the most we may hope that the Matron may be able in time to inculcate some degree of self control ; to make the girls more outwardly decent in word and gesture, to train them to habits of industry and cleanliness, and teach them to sew and wash, so that when they are discharged they will be able to gain an honest livelihood without sinking back into the infamy from which they were rescued. If some kind middle-aged ladies would take some of the better behaved girls into their service, they might preserve them from evil companions and help them to obtain a respectable position amongst their fellows.

Prevention is better than cure, but as there always will be criminals amongst us there must be some means of punishing them and preventing them from becoming a nuisance to their respectable fellow citizens. Punishment is an evil which we make an offender suffer as an example and a warning to others : criminal proceedings are to prevent future injuries. There are many people in England who are strongly opposed to the infliction of the death penalty for wilful murder, and these numbers are yearly increasing. But I am sure it would be a great

mistake to abolish it in this colony The fear of hanging has a very deterrent effect on the would-be murderer : I have some experience in the matter and I say no man likes to be hanged, and the most hardened criminals show an outburst of feeling when they are told that their sentences have been commuted to Penal Servitude for Life. Imprisonment is resorted to for two reasons ; first as a punishment and example to others, and secondly to keep a dangerous criminal out of the way of harming his fellow citizens. For the latter purpose Imprisonment as practised in this colony may be efficacious, but as a punishment and deterrent it is far from being satisfactory : our prisoners are much too comfortable, the hard labour inflicted by the Law as part of the sentence is mostly disregarded. None could call the constitutional which our Georgetown prisoners take to the sea wall and the pleasant pic-nic which they have on the slopes of the embankment, hard labour , and as they walk home they are greeted by their friends who find opportunity to tell them the news, and slip a bit of tobacco or a cake of sugar into their hands as they pass. Prisons should be made hateful to the prisoners and not as now a comfortable retreat where a man is better housed, better fed, with medical comforts and free doctors if he is ill, than hundreds and thousands of honest people outside. Although they have innumerable opportunities very few of the prisoners ever attempt to escape, they know when they are well off. They remind one of a story of an Indian prison where a dangerous riot was quelled by the Keeper telling the prisoners that if they were not quiet he would turn them all out of the prison ; this subdued them at once. Let

our Gaols be built outside our large towns, with plenty of space within their walls, so that when a prisoner is once committed to gaol he must never come outside until his sentence has expired : hard labour can easily be found inside the prison, and a part of each week should be performed in solitude.

It is a great misfortune that our officials in high places have such a strong objection to whipping as a punishment : there is nothing more effective, nothing cheaper. From all time a man's skin has been his most cherished possession. JOB lost children and wealth with comparative patience, but SATAN knowing human nature said to GOD : "Skin for skin, yea all that a man hath will he give for his life," and when poor JOB was so smitten with sore boils all over his skin, he cursed the day of his birth. There is nothing that has such terrors for both black and East Indian people as the cat-o'-nine tails. When plantain-stealing became epidemic the lash put it down : when razor-cutting was prevalent the lash was resorted to and succeeded ; when garotting had become common in England, the cat was the only instrument that could protect the lives and purses of honest citizens. I know of my own knowledge that criminals regard a sentence of penal servitude with indifference, who cringe with terror at the thought of the cat, especially if the flogging were ordered to take place in public on the estate where their crime was committed. But the philanthropists say : "It is so degrading." How can one degrade an habitual thief or burglar, a murderous garotter, a woman-chopper ? It is not any degradation he feels when under the lash ; it is the pain, the keen whipcord cutting into his flesh, and making him yell with


agony, it is that which he dreads. But he for his part never thought of the pain which he inflicted on the unfortunate old man whom he had garotted, or the slight woman whom he hacked all over with his sharp cutlass : brutes should be treated as brutes, and the whip is the only argument that appeals to their feelings.

I have tried not to draw too strong a picture or to make out our population worse than they are. The general behaviour of the people is good and quiet, and will compare favourably, as far as orderly conduct is concerned with the population of any European Capital. But there is no denying the fact that there is an undercurrent of brutality which finds its expression in many cases of violent assault ; and a carelessness with regard to the sanctity of property which is shown in numerous thefts, embezzlements and burglaries. It is, however, gratifying to know that crime does not increase in proportion to the population, the number of offenders during 1887 shewing a considerable reduction from those of 1886 and 1885, and we have every reason to hope, with better sanitary arrangements, a more widespread and wiser system of education, and more severe punishments for habitual criminals, that our Criminal Classes will soon shrink into much smaller dimensions.



"Man's Footsteps."

By James Rodway, FLS

HE descriptive name of "White Man's Footsteps" is given to that insignificant weed the plantain (*Plantago major*) by the Indians of North America. When the savage sees its rosette of leaves on the prairie he recognises it as an indicator of the near approach of civilized man, and knows that he will soon have to move on before the march of the strangers. Like all true weeds the plantain only flourishes in connection with man's presence, and this characteristic must have been noticed at the very early period when the Romans gave it a name derived from *planta*, the sole of the foot, thus stamping it with a distinctive title to all intents and purposes the same as that of the American Indian. Where the European makes his home, in whatever quarter of the globe it may be, this humble weed appears as his companion, and where it is not strong enough to exist as a field-pest it finds a congenial spot in some corner of his garden.

Although not a tropical weed, it is able to survive conditions that none of the favourites of the garden could endure, and while it would be quite impossible to naturalize buttercups and daisies in British Guiana, the plantain finds a congenial home here and there, even in some of the little gardens of the bovianders far away from the coast.

The power of endurance in the great weed family as distinguished from the prettier native flowers, strikingly resembles that of the European as compared with other

racés. In the temperate zone the weeds of colder climates flourish in the open field, but when they have become naturalized in the tropics, they acquire the habit of sociability, flourishing only near houses and in gardens. While the garden and field pests of temperate climates are spreading all over the world and making their appearance within the tropics, the large family of East and West Indian weeds are making their way into Southern Europe. In the great struggle for existence these plants have become strong and vigorous, armed with stiff spines or hairs, built up with wiry and fibrous stems, and flavoured with disagreeable tastes and smells. Like a legion of invaders they are marching over the world, gradually driving the native plants farther and farther, until ultimately as man advances, the Botanist will hardly be able to find a specimen of the characteristic flora. The most noticeable instances of weed aggression will be found on small islands. The native vegetation has almost disappeared from Barbados and Madeira, while in St. Helena where certain species were peculiar to the island, some of them will soon be found only as specimens in our great national herbaria. A tree in the last island has lately been figured in the "Gardener's Chronicle" as the "last of the race."

In this colony man has done very little to modify nature, but the work is progressing slowly, and as the swamps are drained the native plants are being gradually driven farther and farther, to make room for about a hundred species of foreign plants which are generally unsightly and disagreeable. The line of cultivation on the coast and up the rivers is coincident with a distinct flora, which could not have existed in the

colony when it was bordered by a fringe of mangrove and courida trees. The coast plants are very rarely found at any distance in the interior, even where the land is cultivated; the clearings, however, have their characteristic weeds which will be presently mentioned. The most striking examples of the coast weeds may be seen in the grasses. As all colonists know, grasses grow rampant on all the estates' dams and road-sides to the exclusion of almost every other kind of vegetation. The sour grass (*Paspalum conjugatum*) is the most common; it is useless as fodder, because hardly any herbivorous animal will eat it in the green state, although it is said to make passable hay. It prefers moist ground but cannot exist beyond the belt of cultivation. There is a continual struggle for existence between this species and the Bahama grass (*Cynodon dactylon*). During the rainy season the sour grass grows rampant everywhere, extending its long creeping runners in all directions, so that every other weed is smothered by its dense growth. As the dry weather comes however, it dwindles and becomes less and less, while the pretty Bahama grass begins to take its place, gradually covering the road-sides with its delicate foliage, until the heavy showers bring its antagonist again to the front. Although the sour grass is the follower of cultivation, it is not an indicator of it, on the contrary, good drainage like drought eradicates it for a time, but being provided with a marvellous power of endurance in its roots, and also from its bearing myriads of seeds, it recovers from the longest dry season very quickly.

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Although there are many other grasses scattered over the coast, none of them can compare with the above-

mentioned in either endurance or wide distribution. Some of these as well as other plants are provided with hooked seed-vessels, so that they may be distributed by animals to a considerable distance. These appendages are very rarely found on plants that grow in the swamps or forests, while they are rather common among the pests of cultivated land.

Very few of the common weeds are either pretty or showy. Here and there a wild ipecacuanha (*Asclepias curassavica*) enlivens the roadside with its rich scarlet and orange flowers, or a rattle bush (*Crotalaria retusa*) makes a little colour, but there is nothing to compare with the pretty wild flowers of the dry savannahs of the interior. • In some places the black sage (*Varronia curassavica*) almost covers the ground with its straggling woody branches, its stinking, bitter leaves being rejected by every animal. In neglected yards several species of *Solanaceæ* spread their prickly stems over the ground, or the stinking fit-weed (*Eryngium foetidum*) makes its presence known by the nasty smell it exhales when trod upon.

From the fact that certain plants are only found in connection with the presence of man, the question naturally arises, have they been developed since man took to tilling the ground, or could they exist apart from his presence? Among cultivated plants developments have occurred which in many instances would absolutely prevent the species from propagating itself in a state of nature. The sugar-cane for example, bears a large panicle of flowers but never produces seed, neither is there any record of perfect seed ever having been developed. That such was not originally the case is

obvious, but having been grown from joints for ages, it has lost its power of seed bearing, and therefore is unable to exist apart from cultivation. The banana is another instance of loss of power through disuse ; when left to itself it sometimes produces a few black specks inside the fruit, but never perfect seeds. Other familiar examples of the development of one faculty at the expense of another, will be found among the sweet herbs, such as mint and thyme, which rarely flower under cultivation. The toya (*Dianthera pectoralis*) although so commonly grown in Georgetown is never seen in flower, while on the contrary in the wild state it flowers freely.

A very large proportion of the commonest weeds are of annual duration. In developing plants of this class in temperate climates, the change of seasons must have been the principal factor. Where however plants are not subject to alternations of cold and heat, drought and deluge, annual plants are entirely absent. In the forests of Guiana all the species are perennial, while on the savannahs where the seasons have more influence annual plants are not uncommon. A rather interesting example of the apparent development of an annual plant from a perennial may be seen in the common silver fern (*Gymnogramma calomelanos*). This plant may be considered as one of "Man's Footsteps" as it is always found in clearings, on old brick-work, or on the sides of estates' trenches, appearing as if the spores were brought to light by turning up the soil. Like nearly all ferns it is perennial, but a rather curious circumstance in connection with its manner of growth in British Guiana is the fact that it behaves as an annual under certain

conditions. During the rainy season it may be found scattered everywhere along the sides of the trenches, on the brick-work of old water vats, or even on heaps of burnt earth by the road sides. Not being able to live during the dry season it comes to maturity in a month or two, scattering its spores everywhere, and then perishes as soon as the rains cease. This is apparently the only fern in the colony that may be called a weed, and it may be considered as in course of development to suit the altered condition of the cultivated districts. It is never found in the forest or on the savannahs, except in cases where there has been a clearing, but once the soil is laid bare, it may be many miles from the nearest cultivated ground, it comes up in profusion.

The capability of certain plants or seeds to lie dormant for generations, or perhaps ages, is one of the wonders of vegetable life. Make a clearing in the forest, dig a ditch, or throw up an embankment, certain plants will be sure to appear that could not have been found in the neighbourhood before the disturbance. Terrestrial orchids of very rare species are commonly found in England on railway banks, while in Demerara the *Catasetum discolor* is plentiful only on the sandbanks thrown up by the charcoal burners. The question naturally arises, have their seeds lain dormant for ages? There appears to be no limit to the vitality of seeds under favourable conditions. One of the most striking illustrations of endurance was recorded in "Science Gossip" some years ago. A field of turnips had been ploughed up, and planted as an orchard; it remained in that condition for over forty years, when the fruit trees becoming old and almost past bearing they were grubbed up, and the

land ploughed over, with the curious result of a fair crop of turnips. If the turnip seed could remain so long in the earth without losing its vitality, it is almost impossible to place a limit to the life of other seeds; it may therefore be quite possible that the weeds of forest clearings may have been lying dormant since the time that the trees first grew on the same localities.

Traces of the white man's footsteps are quite common, along the banks of the rivers in this colony. The Dutchman's wind-mill or sugar house is gone, the plantation that once resounded with the cries of slaves under the driver's whip, is overgrown with forest trees, but here and there the Botanist will notice his footprints. In cutting a path through the bush he may come upon a cocoa tree, bread-fruit, or a few mangoes still holding their own in the struggle for existence. Some approximation to the date of a clearing may be gleaned from these living relics of the care taken by the former proprietors of these plantations. When a large mango tree is hanging over a creek it may be surmised that a clearing existed at some later period than the beginning of this century as it was not till 1782 that the first plants of this wide-spread fruit-tree were introduced into the West Indies. The stories of the cultivated plants of tropical America are very interesting, and show the great perseverance of our ancestors. The great care taken of the first coffee plants, the distribution of the sugar-cane, and the introduction of the plantain, have stories that are almost romantic. We are indebted to the French for many of our exotics and among the rest the mango. In 1782 a vessel was despatched from Mauritius with a quantity of mango and cinnamon plants, as well as

several other eastern plants of beauty or utility, intended for the French colony at St. Domingo. Special care was taken of them during the voyage and there was every probability of their arriving at their destination in good health, but fortunately or unfortunately the vessel was captured by Lord RODNEY, and its contents taken to Jamaica, whence in a few years the plants were distributed over the West Indies. The story of the Mutiny of the Bounty should be of the greatest interest to West Indians, as that vessel was fitted out purposely for the introduction of the bread-fruit. After the disasters of Capt. BLIGH'S first expedition another was soon fitted out, and in the year 1793 he arrived at Jamaica with a fine collection of plants, including bread-fruit Otaheite gooseberry, and some of our most handsome garden flowers. By the agency of man most of the half-wild fruits and flowers which are so common everywhere, were introduced from distances which were tremendous in the age of sailing vessels and before the discovery of Wardian cases. The failures were numerous, many and many a time the plants died on the passage, but in the end success rewarded the collectors. When allowances are made for the deficient means of communication, the number of privateers and even pirates, and the fact that the West Indies was a naval battle-field (if such a term is admissible) it is almost wonderful that the mango should be common in Essequibo in the time of Dr. RODSCHEID, about twenty years after the introduction of a few small plants into Jamaica.

About the year 1690 the governor of Batavia having succeeded in raising a few coffee plants from seed obtained from Mocha, sent one to Amsterdam from

which plants were distributed throughout the Dutch colonies including Surinam. From one of the plants which had been given to LOUIS XIV. in 1714 a number of seedlings were despatched to Martinique in charge of one M. DE CLIEUX a few years after. From unfavourable weather the voyage was prolonged, until the water running short, the whole ship's company were at length reduced to a very small allowance. As a matter of course none could be spared for the coffee plants, and consequently they withered and died, until only one was left. M. CLIEUX being determined to save this plant divided his scanty share of water with it, until he happily arrived at his destination with his charge still living. Coffee planting was commenced in Surinam in the year 1718, but the Dutch would not allow either seeds or plants to be taken from the colony. A Frenchman, however, having run away from Cayenne to Surinam, and being desirous of returning, purchased the good graces of the French Governor by smuggling a few coffee berries into French Guiana.

Having shown that weeds and cultivated plants are signs of the presence of the white man, or the relics of his former occupation, it remains to be mentioned that the native Indian also leaves his traces in the forest. In wandering through the bush, the explorer or botanist is continually coming upon spots where the vegetation differs entirely from that of the surrounding country in such a manner that his attention is at once arrested. These places are usually situated on sand reefs overlooking the rivers or creeks, and the most obvious point about them is the absence of large forest trees. There may be a few fruit trees such as the Saouri (*Pekea*

tuberculosa) but the general character of the vegetation is decidedly weedy. But what a horrible lot of weeds ! From a large shrub hangs a veil of what looks like some pretty grass, but go a little closer you will find that its stems and leaves are edged with saw-like teeth, which, if they should happen to be drawn across the face or hands in passing through the bushes, will cut a deep gash through the skin in an instant. It is a species of razor-grass (*Scleria scandens*) and deserves its name as much as any other of the genus. A little farther on may be seen a lot of shrubby Solanums, armed with stout prickles, which can only be passed by frequent use of the cutlass. A few plants of the Krattee (*Nidularium karatas*) are always present, their impregnable circles of spiny leaves forming an efficient protection to the soft fruit in the centre, through which no animal can penetrate. Pine-apples are also always present in these places, and these together with krattee may be called "Red Man's Footsteps." Wherever the Indian has had a home these plants remain as evidence of his former presence. Thousands of such places are to be found throughout the colony, and at first sight they appear to confirm the accounts of the first explorers, that Guiana was densely populated when discovered. But in face of the fact that the Indian is continually wandering from one locality to another as his provision fields become exhausted, or for other reasons, the evidence becomes very doubtful. It may be possible by careful observation to get some idea of the time when these settlements were abandoned. A small clearing in the forest when abandoned, will soon get covered with grasses, silver ferns, and creeping plants such as *Phytolacca*. These will gradually give way

before a dense growth of shrubs, and finally a few trees will succeed in piercing through the jungle. As they spread their branches over the bushes these become less and less rampant until the place becomes indistinguishable from the surrounding forest. On the sand-reefs, however, a very long period may elapse before any tree can establish itself on a clearing, and if the denuded space is of a great extent, ages may elapse before the traces of occupation are obliterated. The inhabitants of the upper Demerara river are still able to trace the line of the great forest fire that extended between it and the Berbice river a hundred years ago.

Are the pine-apple and krattee wild plants? They appear to flourish wherever the soil is suitable, but always connected with the traces of man's presence in some past time. It may have been centuries since the parent plants were thrown down near the Indian village of which they are the only relics. The pine-apple is certainly a native of America, but it has the characteristics of a cultivated plant, while it is so widely distributed and requires so little attention that it may be considered as a tropical weed rather than a development of man's care and attention. Like the banana and sugar-cane, it produces no perfect seeds, but while the former hardly exist for a few years without cultivation even under the most favourable circumstances, the pine-apple on the contrary may flourish for ages. It has been suggested that the New World is really the older, is it possible that we have here an example of development far beyond anything to be found in the Eastern Hemisphere? Has the pine-apple been developed for such a long time that it is capable of flourishing independently?

If such is the case, then the banana and sugar-cane are only infants, and the theory of the dependence of cultivated plants will admit of considerable modification.

The krattee belongs only to this continent and has probably been used for making hammock cords for ages. Like the pine-apple it is never found truly wild, but wherever there is, or has been, an Indian settlement this plant is certain to be found. Not bearing an edible fruit, its development has progressed in an entirely different direction. For cordage, length of fibre is of the utmost importance, especially to savage man, who has no conveniences for twisting, and here we have perhaps the longest fibre known, the leaves being ten or twelve feet in length.*

The section of Botany which considers the origin and distribution of cultivated plants and weeds is now receiving very great attention, and deserves far more consideration than is generally supposed. To Geology it has already given most valuable indications of the distribution of sea and land in past ages, and it is expected to throw as much light on the great science of Anthropology. Till within the last thirty years the natural history of man was hardly thought of, much less studied, but since that time it has been extending its field so as to embrace a great portion of every other science. It may be confidently predicted that a knowledge of the distribution of weeds and cultivated plants will throw great light on the history of man's wanderings,

* The Indians of the Demerara river have discovered that these fibres make good thread for sewing, and it is rather interesting to watch a woman drawing out a fibre from the half dry leaf to thread her needle.

and confirm some of the discoveries of philologists as to the origin of the great Indo-European race. Everywhere on this continent there are indications of the growth of a distinct civilization widely different and unconnected with that of the Old World, and our native plants appear to be in many instances farther developed than their congeners of the east. Man's influence is best seen in the cultivated annuals, and of these the American corn (maize) will rank very prominently. The cassava again, and the way in which its poisonous properties are eliminated, show considerable penetration on the part of some ancient race. Up to the present time the cradle of the American Race is unknown, although theories of various kinds are continually being promulgated; perhaps plant distribution may throw a light on the matter.*

List of the most important Plants cultivated in Guiana with date (where obtainable) of introduction to the West Indies, and place from which derived :—

Akee, 1778	...	...	...	...	...	West Africa.
Almond (<i>Terminalia</i>), 1790	...	...	...	...	...	East Indies.
Bamboo	...	...	...	...	...	East Indies.
Bread Fruit, 1793	...	...	...	...	...	Otaheite.
Cinnamon, 1782	...	...	...	...	...	Ceylon.

* While giving all due consideration to man's influence in the distribution and development of weeds and cultivated plants, it must be thoroughly understood that the original variation took place without the slightest effort on his part, and in the case of weeds, against his wishes. The environment which has produced the plants in question is different from that which has been working for ages to develop such wonderful contrivances as are found in the Orchid family, but they all go to prove the capability of nature to accommodate itself to any and all circumstances.

Coffee, 1716...	...	...	...	...	...	Arabia.
Ginger	...	...	...	...	...	East Indies.
Grains of Paradise (Guinea Pepper), 1785	...	...	...	...	...	South of Europe.
Horse Radish Tree (Moringa), 1784	...	...	...	...	...	East Indies.
Jack Fruit 1782,	...	...	...	...	...	East Indies.
Mango, 1782	...	...	...	...	...	East Indies.
Mangosteen, 1782	...	...	...	...	...	East Indies.
Ochra	...	...	...	...	...	Africa.
Oranges, Lemons and Limes, 1493 ?	...	...	...	...	...	South of Europe.
* Orange, Mandarin, 1788	...	...	...	...	...	China.
Pepper, 1787	...	...	...	...	...	East Indies.
Plantain, 1516	...	...	...	...	...	East Indies.
Pomegranate, 1493 ?	...	...	...	...	...	Spain.
Rice ...	...	...	...	...	...	East Indies.
Rose Apple (Plum Rose) 1762	...	...	...	...	...	India.
Sugar Cane, 1506	...	...	...	...	...	Canary Islands.
Sago Palm (Cycas), 1775...	...	...	...	...	...	East Indies.
Tamarind	...	...	...	...	...	East Indies
Yam, Common	...	...	...	...	...	East Indies.

AMERICAN PLANTS.

Anatto	Cassava	Mammee Apple	Sapodilla
Arrowroot	Cocoa (Cacao)	Mespil	Sour Sop
Avocado Pear	Cotton	Papaw	Tobacco
Capsicum (Peppers)	Custard Apple	Pine Apple	Yam, Buck.
Cashew	Maize	Potatoes	



Gold Mining Notes.

EXTRACTED FROM THE 2ND, 4TH, 5TH AND 6TH ANNUAL REPORTS OF THE
STATE MINERALOGIST OF CALIFORNIA.*

By G. H. Hawtayne, C.M.G., F.R.G.S.



WISH to explain that my name appears in connection with the following extracts from the Reports of the State Mineralogist of California, simply because the Editor of *Timehri* asked me to transcribe or condense such portions of those reports as might be useful to its readers, and while wishing that he had selected some more practised and competent "devil," I shall be glad if the result of my task is to communicate some of the useful or interesting information contained in these reports to those employed in developing what, it is to be hoped, will before long prove a source of abundant wealth to our colony and its people.

According to the remarks on the geology of gold contained in the reports, there is reason to believe that the heaviest metals exist in the largest quantities near the centre of the earth. They exist much disseminated

* These reports which treat in detail of many mineralogical questions of general importance and more especially of gold mining, have been forwarded to the Society by the State Mining Bureau of California, through Mr. HENRY S. DURDEN, with whom an exchange of samples of colony woods had been made for Californian ores and minerals. The ores and minerals are exhibited in the Museum; and the reports are deposited in the Reading Room, where they are available for consultation by those who desire a more detailed acquaintance than can be obtained from the following notes most kindly prepared by Mr. HAWTAYNE.—ED.

in the eruptive rocks, and as the sedimentary rocks so called are built up from the ruins of these, the presence of precious metals in them is easily accounted for. Geologists tell us that the "mother vein", the source of all gold, is of an unknown geological age but is older than the formations in which gold is found—and that but for the upheaval of certain rocks which is continually but slowly going on, gold would never have been known. Gold is found either as free gold in the form of nuggets, which may be lumps of several pounds weight or as minute grains, or as veins, more or less perceptible, permeating other geological formations as quartz, clay, &c. Certain metals are always found together, gold and iron are always associated, just as lead always contains silver. HUMBOLDT stated that in Guiana gold is sometimes disseminated in an imperceptible degree in the granite rocks without any evidence of small veins, and in New South Wales granite, and in Siberia, clay and slate are permeated by small particles of gold. Dr. PERCY the celebrated English Metallurgist, thinks that gold is precipitated from an aqueous solution, while Sir RODERICK MURCHISON, who it will be remembered foretold the discovery of gold in Australia, believed that quartz is of volcanic origin and at one time was in a gelatinous condition in which it enclosed gold mechanically. Gold is found more or less abundantly in every part of the earth, and gold mines have been worked from the time of the Phœnicians. But it is not intended to enter into the geology of the precious metal nor the history of its mines, but rather to select those portions of the reports dealing practically with its collection &c., which may be of use to the gold-seekers of British Guiana.

Placer Mining is "the gathering by mechanical means of native or free gold found disseminated in alluvial deposits in certain parts of the earth's crust." Every variety of placer mining is based on the fact that gold is heavier than most other metals or substances.

In placer mining the auriferous material is obtained by digging up the surface, or in larger operations by hydraulicing, as it is termed—drifting, blasting, sluicing, and other modes.

Hydraulic mining occupies much of the Reports under contribution, for although it has been recently prohibited in the State of California because the debris resulting therefrom was found to be detrimental in many ways to many interests, it was the easiest and cheapest way of disintegrating the gravel banks in which the gold was richly deposited.

"Hydraulic Mining" is defined as the application of natural forces to move large quantities of earthy matter and the collection of a certain quantity of gold too small to be profitably severed by other and easier methods. To be successful, certain conditions only to be found in a newly settled mountainous country are required, namely, an abundant supply of water, a deposit of loose, easily disintegrated earth, containing a paying quantity of gold, a bed rock not too deep below the surface, a channel into which the debris can be discharged, and high ground above the drains to which water can be conveyed to give the required pressure. This system of mining was known to and practised by the ancients, and an aqueduct built at Alatri in Italy 200 years B.C., of earthenware pipes imbedded in concrete for eleven and a half miles, capable of sustaining at its lowest point

a pressure equal to eleven and a half atmospheres, still remains in good preservation. The report contains a long extract from PLINY on Gold Mining as practised in various parts of the world in his day.

It would take too much space to transfer to these pages the interesting accounts of the vast works undertaken in the prosecution of hydraulic mining in California; and moreover this is not necessary on the present occasion, since the conditions under which gold is sought and collected in that region, differ widely from those existing in Guiana. It would be difficult for instance to transport to our gold fields iron pipes 30 inches in diameter, and to lay them down in lengths of several thousand feet. The photographs which have been kindly forwarded with these reports from the Bureau, shew very vividly this mode of applying water, and its exceeding force.

"Drift Mining" which is a form of placer mining, is the gathering gold from the bed rocks on which the auriferous gravel banks lie, and which are generally considered to be ancient river channels. The deposits are worked by tunnels or drifts driven into the banks.

"Ground Sluicing" practised only when water is plentiful or where the yield is not estimated to pay for the more expensive process, is carried on by bringing water in a ditch to a high point, so as to produce a strong current across the claim. A ditch is then dug which is extended by the water cutting its own way, aided by the miners breaking down its sides with pick and shovel, and if there is no rock bed at the bottom, one is made by throwing in stones. The ditch is furnished with a sluice box and riffles at its further end.

Dirt is thrown in and carried forward by the water which is afterwards shut off when a sufficient quantity has been washed. The stones are then removed and the dirt washed in a rocker, long tom, or shorter sluice.

Blasting is resorted to by the hydraulic miners to shatter the large boulders and masses of clay from which the surrounding dirt has been torn and washed by the stream of water directed against them, or when the gravel is too hard to be disintegrated by water. It is also extensively used by the quartz-miner. Where the material to be broken up presents a flat surface, a vertical shaft is sunk fifteen or twenty feet deep and a small chamber excavated at the bottom into which five or six kegs of gunpowder are placed, thoroughly tamped, and fired by electricity. Where a bank has to be blasted, a main tunnel or adit is run in for a distance one and a half times as great as the height of the bank to be broken down. From the end of this, cross adits are driven at right angles to the main adit. Kegs or boxes of powder are placed along the adits in rows, the tops of the middle row removed and wires laid along for connection with the battery. A bulkhead of timber is then placed across the main adit where the lateral arms intersect it and the adit tightly packed with sand and gravel to the mouth. When all is ready, the conducting wires are connected with the electric battery and the charge fired from a safe distance. Large quantities of powder are used. The report mentions one of no less than 50,000 lbs. fired in a drift 275 feet long with cross drifts by means of which 150,000 cubic yards of earth were loosened ready for treatment by the hydraulic pipe. Gunpowder is not the only explosive used. The

family, of which dynamite is the most familiar member, contributes largely to mining blasts.

In gold mining several implements are used, such as pans, cradles, toms and sluice boxes. In California the placer miner's pan is of iron, preferably stamped out of a single sheet since solder is objectionable; its usual dimensions 10 inches diameter at bottom, 16 inches at top, and 2 2-10ths inches deep, with a rim strengthened by a strong iron wire rolled in. In Mexico a horn spoon is used for small quantities, but the Brazilian batea, or as it is called here battel, appears to be better. It should be a disk of seventeen inches diameter, which being turned conical 12 degrees, gives a depth of $1\frac{1}{2}$ inches from centre of surface. The thickness may be $\frac{3}{8}$ of an inch. The other edge perpendicular to axis (which is scientific for "bottom") will require wood $2\frac{1}{2}$ inches thick. The best wood is Honduras Mahogany. The "battels" imported for use here are of similar shape and dimensions to these, but are of Poplar. Of course we have in British Guiana wood as good for the purpose as Mahogany or Poplar, but the cost of manufacture precludes the bateas or battels being made here.

The iron pan is thus used in California:—the superficial soil having been removed, a portion of the alluvial matter containing gold is placed in the pan, which is then sunk horizontally below a stream or pond; when full the pan is placed on the miner's knees or on some convenient stone. The miner breaks the lumps with his fingers and stirs the contents of his pan until a soft mud is formed, then the pan is sunk below the water and is so agitated that gold gravel (in California) and coarse sand sink to the bottom, while the lighter particles flow

over the rim and escape. In time the contents of the pan become clean. Then all large pebbles are examined, and if worthless thrown away by a motion of the thumb (which has to be learned), and the coarse particles remaining are raked out and rejected. The pan is now inclined but only partly, under the water, and its contents agitated so that the coarse sand or material flows over the edge in a thin stream which the miner watches so that no particle of gold escapes. When but a small quantity remains in the pan it is lifted out of the water, and the concentration and perfect separation of the gold is commenced by an undulatory motion being given to the pan causing the sand to flow with the water across its bottom, revealing a cluster of gold particles. The pan is then inclined towards the sand, leaving the gold stranded in one portion and the sand and water in another, and the miner by pouring water behind the sand, washes it away, leaving in the pan only gold, which is thus collected wholly by its specific gravity or weight.

The batea or battel is used in much the same way. Several pounds of pulverized ore or gravel are placed in the batea which is held under the surface of water, and broken up with the fingers into mud and a circular motion is given to the batea which causes the lighter particles to flow over the edge and the heavier to sink and collect at the centre. The batel being lifted, the water remaining in it is made to sweep round the centre, while an edge is depressed towards which the heavier particles of gold &c. gravitate. A blow struck on the side of the bowl assists the operation and the settlement of the gold.

The miner's cradle is like the old-fashioned child's cradle mounted on rockers and rocked in the same way.

The machine is described as about four feet long and two wide, with an inclination, and the open lower end allows the water and tailings free outlet. At the upper end there is a box or hopper with a sheet-iron bottom pierced with half inch holes. This hopper can be easily removed and replaced. Under it there is a canvas apron inclined towards the head of the cradle at an angle of thirty degrees, but touching neither the floor of the cradle nor the bottom of the hopper. Across the floor of the cradle and transversely to the flow of the water are nailed two riffle bars each an inch high, one near the lower end and the other near the middle. The machine is placed on level hard ground near a convenient, but not necessarily large water supply. The miner sitting or kneeling near the machine, rocks it with one hand and with the other dips and pours water, while his partner places the carefully selected "pay-dirt" in the hopper. By rocking and pouring water the finer portions and the free gold pass through the holes and are with the water thrown by means of the canvas apron to the extreme upper part of the floor, and thence flow downward and escape at the lower end of the rocking floor, the gold and heavy black iron sand being arrested by the riffle bars. The larger stones, &c., remaining on the iron plate are from time to time picked out and thrown outside. The smaller ones when accumulated in any quantity are well washed in the hopper, and carefully examined for any gold nuggets among them. The hopper is then lifted out and the pebbles being jerked out, is replaced. "Cleaning up" at the close of the day means removing the hopper and thoroughly washing the canvas apron so as to secure any particles of gold

entangled in it. The apron being removed, the cradle is set up on end and the floor washed into a miner's pan or bowl, and the gold collected as before described. The rocking motion not only mixes the contents of the hopper, but by agitating the sand on the floor allows of the gold particles being arrested by the riffle bars and the lighter sand being carried off by the flow of the water.

If the claim is unusually rich, a "clearing up" is made as often as advisable but the final wash up is always made at the end of the day. When the gold is very finely divided, it is found to be an advantage to place the hopper over the lower end of the cradle and use an apron of thick woollen cloth or blanket, when frequently the gold is arrested by the nap of the cloth.

The inclination of the cradle is governed by the condition of the gold and of the earthy matter in which it is contained. The cradle, however, is not an economical apparatus as from its rude construction much of the free gold is lost, as is proved by some of the earlier placers being worked over again and again with equal success. It is now used by only the Chinese miners. The rocker after being known and used for hundreds of years has been superseded by the "Long Tom," which in its turn has been discarded, at least in California, for the "Sluice-box." The Long Tom which was used in California is described as a wooden box or trough 12 or 14 feet long, two feet wide at the upper and three feet at the lower end. The bottom is covered with iron sheets overlaying each other like shingles. The sides ten inches high are at right angles to the bottom. The lower end is closed with a sheet iron screen punched with holes, and the top of this screen is turned up at a slight angle. The Tom is

placed on some convenient support and tilted at an angle of from 6 to 10 degrees. The screen at the end projects over a riffled box extending in the same direction and at the same angle of inclination. Six or more cleats are nailed across the bottom of the box. A constant stream of water is directed through the upper box or Tom, and the dirt thrown in by several men who keep it well stirred, the larger stones being thrown out with a fork like an agricultural fork.

As, however, the longer the "dirt" is subjected to the action of water the more fully is it disintegrated and the gold set free, and the larger the number of riffles the more impediments are offered to the escape of the gold, these greater advantages are obtained by the use of the Sluice-box.

This is made in twelve-foot long sections varying in width from one to two feet, and about ten inches high, out of three boards riveted together with open ends. One end is a little wider than the other so that the various sections may be joined telescope or stove-pipe wise. The support is of trestles—widened to the requisite degree—and upon it are placed the sections, each entering the lower one for about four inches. In lieu of trestles piles of stone or heaps of earth are sometimes used. This construction of triangles is extended as far as the miner judges proper. Movable riffles are placed along the floor of these troughs, and water is brought to the head of the sluice, when the "dirt" is shovelled in—an inclined board having been first nailed to the side of the trough opposite each shoveller, so as to prevent the dirt being thrown beyond the sluice. The number of shovellers is limited by the supply of water,

and the character of the "dirt," which is not supplied faster than it can be completely reduced to mud by stirring. The large stones are forked out as when the Long Tōm is used. The sluice is usually inclined 6 inches for each section of 12 feet. The riffles are made in sections of 4 feet in length, and wholly cover the floor of the sluice to which they are fastened by cleats or wedges. These riffles form wooden gratings with bars, one to four inches long and four feet wide, laid lengthwise, and held in place by two or three cross-pieces halved together, so that the cross-bar thus formed arrests the gold and heavy earth which would otherwise be lost.

After the dirt has been running for some time, a little quicksilver is poured into the openings at the lower end of the riffles, and a larger quantity at the head of the sluice which arrests the gold and assists its collection. 500 to 600 lbs. of quicksilver are sometimes used at one operation. The day's work is usually ten hours but on occasions goes on for twenty-four continuous hours. Cleaning up is done once a week—usually on Sunday—by letting water run through the sluice till it comes out clear at the other end. The upper riffles are removed and the sand, gold and mercury washed down to the lower ones remaining. Some loose sand washes over and the rest is scooped up and put in a bucket. When all is cleared up, the result is finished in the miner's pan where all the movable impurities are washed away and nothing but mercury and amalgam remain. The superfluous mercury is collected by squeezing the mass in a thick canvas or chamois leather bag and the amalgam taken out.

The State Mineralogist gives "a tip" as to how to

rob a sluice, which it appears is frequently done. Dip a silver spoon into the mercury, then stir up with it the stuff lying above the cross riffles, and when the spoon is well loaded with amalgam, wipe it off with finger and thumb, and proceed as before. Like samphire gathering, it is, however, a dangerous trade, for when taken the thief is not only well shaken but often strung up.

- Complete and rapid amalgamation only occurs when perfectly clean gold is exposed to the action of pure quicksilver. The fact of gold being alloyed with other metals does not prevent this if its surface is bright. Often, however, gold found in placer mines is slightly tarpished by oxidation of the alloy, and amalgamation is hindered. In California, much of the placer gold is wholly or partly coated with silica cemented by sesquioxide of iron—if entirely so coated, mercury has no action on it—and if this rusty gold, as it is termed, has its iron coat dissolved by means of hydrochloric acid, the silica easily drops off and amalgam is easily formed.

The treatment of rusty gold was described in a Report of the State Mineralogist for 1880, which is not included in those sent to the Society. From a paper read in 1874 before the Royal Society of New South Wales, it appears that the best mode of destroying the mineral compounds, which by enveloping the gold prevented the action of mercury upon it, was by roasting in a furnace devised for this purpose. The resulting sand is made damp and ground with an equal weight of mercury for $\frac{3}{4}$ hour, under an ordinary Chilian mill—the finely ground sand being carried off by a stream of water to the “concentrator,” leaving the amalgam in the mill. Fresh sand is passed through the mill until

sufficient amalgam has collected. When this is cleared out, the sand in the concentrator is slowly stirred for a quarter of an hour, to allow any mercury or amalgam to subside. The water and sand is then passed through a second and smaller concentrator after which it is allowed to run to waste.

The amalgam when removed from the sluices is placed on a strong table on which is placed a large iron kettle, into which the collected amalgam and quicksilver solution, amalgam one ounce to each flask of quicksilver, is put, and the whole stirred. Water is poured into the kettle, and the mixture stirred. The sand and mud which rise to the surface are removed with a large sponge, and this is repeated till the surface is clean. The whole is then stirred with the hands—the dirt which still comes to the surface being scraped off with a card, or bit of leather drawn over the surface. This is repeated with occasional stirring until the quicksilver seems clear. It is then poured into conical bags of canvas through the pores of which the mercury runs leaving the amalgam in the bag. The sodium amalgam should be prepared by the miner and used at once, since if long kept, it becomes oxidised and inactive and the coal oil in which it is kept is detrimental to the collection of gold.

The sodium amalgam is easily prepared from metallic sodium, which can be kept in a wide mouthed bottle in large pieces covered with naphtha. A clean and dry frying pan is all that is necessary. Six pounds of clean mercury are poured into it and dried with a sponge, and then heated hotter than boiling water, but no more. A piece of sodium is wiped dry with a rag, and cut into small cubes; and then the pan being placed in the open air with the

operator on the windward side, one of the small sodium cubes is by means of a wire placed on the mercury. A flash follows and some of the mercury is volatilized; another cube is put in the same place until after three or four cubes have been used, the sodium will sink quietly without any flash. At the proper moment, a solid mass of amalgam will be observed in the centre when the contents may be safely stirred, and the addition of a few more cubes of sodium will change the whole to a mass of crystals of sodium amalgam which can be put into closely stoppered glass bottles—without any addition. A bottle should hold what is wanted at a time, since when opened the residue spoils.

Many of the Californian mines which were abandoned long ago when methods of mining and milling were in their infancy, and when proper machinery, water power, &c., were hardly obtainable, have been worked over with satisfactory results. At one time it was thought that auriferous stone would only be found in paying quantities near the surface; but it is the case that "paying rock" is now met in the deep workings of the Californian mines, and that the best dividend-paying mines are getting their rock from depths of from one thousand to fifteen hundred feet. Mr. MELVILLE ATTWOOD of San Francisco, a practical gold miner of long experience, believes that every increased foot in depth at which paying quartz is found, means prolonged permanency of the gold production of the district. That this is the case with Australian mines, is shewn by the returns from six of these quoted by Mr. ATTWOOD.

Many Californian mines have been abandoned when zones of poor quartz have been met, where, had the

miners sunk a few feet deeper, rich rock would have been met. The character of the rock or "wall" inclosing these lodes has much to do with the productiveness of the latter, and if their walls be, as it is termed, "uncongenial," little or no gold is to be found. In some places, as in the Clogan Gold Mine in Merionethshire, the lodes are only productive when the walls are formed of igneous rocks and not so when they are of slate, &c.

Quartz mining is carried on by breaking up the quartz reef by blasting and manual labour. The gold is extracted by crushing the rock into a fine mud or "pulp" by means of water and mercury under a powerful stamping mill. The Reports do not contain a description of a Stamping Mill, but except that the process is or was conducted in California by means of hides or blankets over which the resulting mud or pulp flows, the machine does not materially differ from those in use in Australia. One of the best constructed was exhibited at work by Queensland in the Colonial and Indian Exhibition. An ancient writer, AGRICOLA, in his work *De Re Metallica*, published in 1621, gives figures of a stamping mill in all essentials the same as that now in use, and he also describes sluices, rockers, and pans similar to those of the present day.

The mills now used are capable of crushing 40 to 70 tons a week. The quartz broken into small fragments by hand is fed into a hopper. The stampers are of solid wrought iron weighing from 600 to 800 lbs., and are raised and lowered about 9 inches some 80 times a minute. In the Australian machines these stampers work in a cast iron box of considerable depth to prevent splashing, and the muddy liquid flows through steel wire strainers 40 meshes

to the inch, and over a series of copper plates covered with mercury, arranged in terraces so that the particles of gold stick on to these plates where they become amalgamated with the mercury. Cross channels or riffles traverse the terraces and intercept the coarser auriferous mineral, and the stream at last falls into a frame consisting of a long shallow box fitted with inclined trays, to which a movement is given by mechanical means, causing the heavier mineral refuse to travel up stream while the lighter particles flow to waste.

The auriferous mineral is ground finer in contact with mercury by being fed into a circular iron cistern, over the bottom of which segments of iron are dragged—by which means, the mineral and mercury are rubbed together and the gold amalgamated.

It may be safely assumed that the method adopted in Queensland in 1886 is an improvement on the Californian Milling, described in the Reports under notice.*

Mr. ATTWOOD'S paper embodied in the fifth report gives ample instruction for sampling auriferous quartz.

[* Most of the Gold quartz of California contains in addition to the free gold, a large proportion of the metal so intimately associated with pyrites ("sulphurets") that a separate process, is required to extract it. The recent method, known as *Chlorination*, as described by Mr. Durden, late Acting Secretary of the State Mining Bureau, is as follows:—After as much gold as possible has been extracted by amalgamation with mercury the remaining material is passed on to "concentrators" which separate the auriferous pyrites from the worthless rock. The pyrites are then roasted in a reverberatory furnace, dampened and placed in false-bottomed tubs coated with asphaltum, and then subjected to the continued action of chlorine gas, by which means the gold is converted into a soluble chloride, which is subsequently washed out thoroughly with water from the insoluble residue. From this solution, the metal is precipitated by proto-sulphate of iron, and is then melted into bars.—ED.]

He recommends that the quartz to be tested should be as true an average of the rock in sight as can possibly be obtained, and be not less than thirteen cubic feet. This is broken to the size of macadam stuff, or road material, with "cobbing" hammers, and the result well mixed. Two cwt. of the broken fragments are then placed on a piece of canvas two yards square, in the centre of which is a stamp-die, and then with hammers the quartz is reduced small enough to pass a two-inch riddle. The die is removed, the broken quartz well mixed, and two samples of 4 lbs. each taken. A "bucking hammer" formed of a piece of iron 6 inches square and one inch thick, fixed on a wooden handle, and a "bucking iron" placed on a piece of canvas so arranged that it collects what flies from under the hammer, will reduce the macadam stuff more rapidly than the "cobbing" hammer. The 4 lb. samples are then passed through TAYLOR'S hand rock crusher till fine enough to go through a sieve with 30 holes to the linear inch or even finer. It is difficult, however, to explain the construction and action of this crusher without the aid of diagrams. It is rapid in action, and does not as is the case with the grinding action of the pestle and mortar, reduce the gold into scales which have a tendency to float and be lost. The crushed quartz is treated so as to separate it from pyritic matter and earthy materials by the "pan" before described, which Mr. ATTWOOD says is better than any other utensil. Its utility would be enhanced by the addition of a small riddle with about 8 holes to the linear inch, to which two long handles are attached. The riddle with the gravel or crushed quartz placed in it, is immersed in a tub of water, and by a quick half rotatory

motion the soil is removed from the gravel or quartz. The portions which will not pass through the riddle are examined for any nuggets or 'cement' that require crushing. The "horn spoon," also previously referred to, is mentioned by Mr. ATTWOOD, who considers it too small for testing purposes—and it is not recommended for other reasons.

- The batea or battel has been already described, and is that devised by Mr. ATTWOOD, who recommends that when an accurate test is required, two bateas should be used, so as to allow of the "tailings" or refuse of the first operation being washed a second time. It is a curious fact, that the grease, which it seems one always has at one's fingers' ends, causes the loss of gold in these washing operations. It is, I presume, because the grease prevents the adhesion of the water, and the air occupying the space thus formed is sufficient to float the small particles of gold which are carried away in the washing. It is therefore recommended that rubber finger stalls should be placed on the right hand fingers, and ammonia occasionally used to prevent grease-contact.

When the gold and pyritic matters have been concentrated in the centre of the batea they are covered with one or two inches of water, and then by means of a bar magnet the magnetic iron removed. This done, the gold which lies in the centre of the batea is converted into hard amalgam by the addition of mercury, the operation being assisted by rubbing the mass with a stall-protected finger.

The amalgam yielded by thus treating the residuum of the 4 lb. samples, is put on a piece of charcoal, and the mercury driven off by a blow-pipe, when the value per

ton of rock is ascertained by weighing the resulting gold. The following table is furnished by Mr. ATTWOOD :—

Prospectors' and Miners' Gold Table to determine free Gold per ton of 2000 lbs. average. Sample for working test 4 lb avoirdupois, 28,000 grains.

Weight of washed Gold 4 lb. Sample in Grains & tenths.	Fineness 780 value per oz. \$16 12.	Fineness 830 value per oz. \$17 15.	Fineness 875 value per oz. \$18 08	Fineness 920 value per oz. \$19 01 •
5 Grains.....	\$ 83 97	\$ 89 36	\$ 94 20	\$ 99 05
4 „	67 18	71 49	75 36	79 24
3 „	50 38	53 61	56 52	59 43
2 „	33 59	35 74	37 68	39 62
1 „	16 79	17 87	18 84	19 81
'9 „	15 11	16 08	16 95	17 82
'8 „	13 43	14 29	15 07	15 84
'7 „	11 75	12 51	13 19	13 86
'6 „	10 07	10 73	11 30	11 88
'5 „	8 40	8 93	9 42	9 90
'4 „	6 71	7 14	7 53	7 92
'3 „	5 03	5 36	5 65	5 94
'2 „	3 36	3 57	3 76	3 96
'1 „	1 68	1 78	1 88	1 98

The importance of such tests is much insisted on in the Reports, and examples are given where their absence has occasioned the expenditure of vast sums of money which were utterly lost, while the fallacy of gauging the value of a rock by pounding in a mortar bits taken here and there, and washing out the gold with greasy fingers in a horn spoon, and then by means of a magnifying glass guessing the gold contents of the rock, is also pointed out.

The weight of the gold which results from the above

separation is to be ascertained by means of a pocket balance which is described in the report, and which seems to be simple and not liable to get out of order, and is said to weigh the $\frac{1}{1000}$ part of a grain.

The fineness of the gold resulting from the operations above described, is ascertained by the use of touch-stone needles made in the manner following:—

• Copper wire is drawn through a wire plate with square holes to about the size of the square point of a ten-penny nail and then cut into five lengths of two inches each. Ten grains of pure gold are melted before the blow-pipe on charcoal, hammered square, and soldered to the end of one of the copper wires. The gold is then filed down even with the sides of the wire which is stamped 1000 representing pure gold. For the other end, an alloy of nine grains pure gold and one of pure silver* is carefully made on charcoal, hammered square, soldered on to the other end of the needle and is stamped 900. The other four needles are made in the same way.

Grains	Gold.		Grains	Silver.		Stamped.
8	2	...	...	800
7	3	...	...	700
6	4	...	...	600
5	5	...	...	500
4	6	...	...	400
3	7	...	...	300
2	8	...	...	200
1	9	...	...	100

The second set is made in exactly the same way, except that copper is substituted for silver in the alloy.

Care must be taken not to make the solder so hot that the alloy is melted and a new and unknown alloy made by fusing with it, and the alloy should be much larger than the needle, so that it can be filed down and the solder removed from all parts except where the copper is joined to it.

The true touch-stone is a black quartz called basanite, found in Bohemia, Saxony and Silesia, and is best

bought. The mode of using the needles is as follows : The metal to be tested is rubbed on the touch-stone and leaves a metallic streak, which is compared with the needles placed in succession beside it, until one is found which appears to the eye the same in colour. A streak is then made with this needle near the streak to be tested, and both are compared under a common lens. If they are exactly alike, the test streak is supposed to be of the same fineness as the needle, if not, other needles are tried and the result is confirmed by touching the two streaks with nitric acid on a glass rod.

Greater accuracy is of course obtained by assay, full directions for which are contained in the report, which it is not deemed necessary to transfer to this paper. For all practical purposes, the test needles will give sufficiently exact results, and having ascertained the amount of gold in a 4 lb. washed sample, and the fineness by the process just described, the table given by Mr. ATTWOOD and transcribed on p. 49, will shew the amount of free gold per ton of 2,000 pounds avoirdupois.

In the Fourth Annual Report, that for 1884, there are full directions for conducting an assay of bullion, but space does not allow of their being transferred to these pages ; besides which, the operation is a delicate one, requiring practice and experience, and therefore more properly left to professional persons.

The amalgam is treated in the following manner called retorting, to drive off the mercury employed, and obtain a residuum of gold. The retort used for small operations is a bowl-shaped vessel of cast iron—its top edge smoothed so as to be in complete contact with the planed edge of the cover so that the two form a perfect joint.

An iron tube rises from the cover and bends down at an angle of 20 degrees. The balls of amalgam being placed in the bowl, wood ashes and clay mixed with water into a thick paste are applied as a lute to the edges, and the cover being fitted, the whole is firmly fixed by means of a clamp and set screw. The superfluous luting being removed, the retort is placed over a moderate fire. The end of the pipe is placed just below the surface of water conveniently placed, and if the fire is properly regulated the pipe need not be cooled. To prevent adhesion of gold to the retort, as may happen, the interior of the retort may be chalked, or the amalgam placed on a piece of paper. Two stakes driven into the ground, with a rod between their tops on which the retort is hung, with a fire of small wood built round it, is a convenient arrangement. When the retort is dull red hot, and no more mercury comes over, the fire is withdrawn and the retort allowed to cool. The bullion which ought to be metallic in appearance and of a gold color, is then ready to be melted.

A caution is given not to open the retort before it is cool, nor to hasten its cooling by water, as great injury will accrue from the poisonous mercurial fumes. Larger quantities of amalgam are refined in large cast iron retorts like those used in gas manufactories, with movable doors and arrangements for aiding condensation by water.

Care in cleansing amalgam before putting it into the retort is essential—neglect of this sometimes causes the bullion to be black, and attempts to remedy improperly retorted bullion by treatment with acids, are almost sure to result in loss. Any impurity in the bullion is best eliminated in the crucible when melting it.

It is believed that in the foregoing extracts is contained all the information of value to British Guiana Miners which can be gathered from the Reports in question, except some matters of detail, which of course can be obtained by reference to them.



Our Cable Communications.

By Saml Vyle, Government Electrician.

THE West Indian in London desirous of telegraphing to Demerara finds himself, according to *Whitaker's Almanack 1888*, privileged to pay the very highest rate per word that is known there.

For the sum of two-pence per word, he can wire his orders to Belgium, and for a single half-penny more he may communicate with France. The three-penny rate is enjoyed by both Germany and Holland ; whilst Algeria, Denmark, and Norway, only seek for an additional half-penny. Austria, Italy, and Spain, are within telegraphic reach for four-pence-half-penny ; whilst Gibraltar, and Portugal, require but another penny. Far-off New Zealand, however, claims the aristocratic fee of " half-a-guinea ;" but it is reserved for gold-producing British Guiana, to contribute the almost prohibitive rate of fourteen shillings per word, or three shillings and sixpence more than New Zealand, notwithstanding the fact that its distance from London is nearly ten thousand miles less.

Under such circumstances the question arises, " How can such things be ? " The world's news, as it is understood or known in London, is considered to be the latest, and most accurate, of any part of the globe , and it is daily transmitted, far and near, by the various Telegraph and Cable Companies. The political changes which are constantly taking place so very largely affect the general commercial interests of the whole civilized world, that

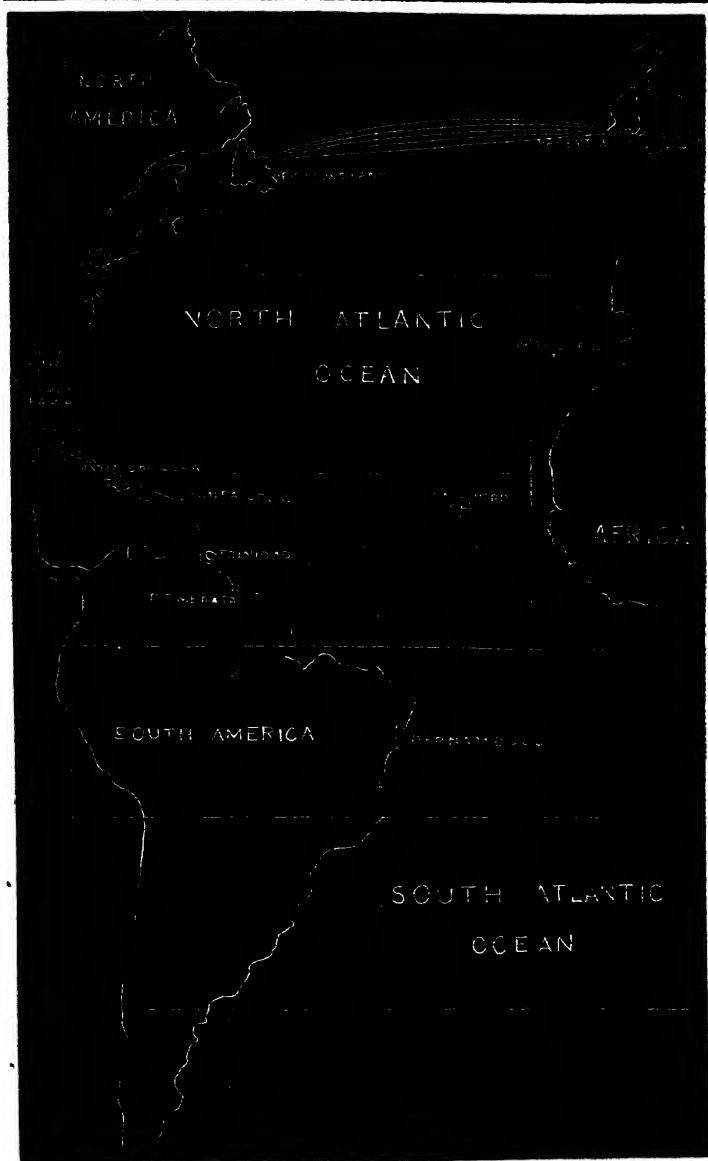
such items of intelligence, together with the prices current, stocks, consols, &c., are matters of vital and necessary importance to commercial men, far distant from, but doing business with Great Britain, Europe and America. To supply this desideratum as early as possible is the special work of the Telegraph Companies, for the performance of which duty the West Indian Colonies pay very handsome subsidies.

Recognizing these facts is it not matter for surprise—at first sight at least—that all the news received in Demerara should come by the apparently roundabout way suggested by the headline “via New York”? Especially is this so, when the British and Continental Sugar Markets have such an intimate influence upon our staple manufactures, or when questions such as that involving the boundary of the colony are being discussed. Surely it is not too much to expect that we might know each morning what has taken place in the Imperial Parliament overnight, notwithstanding the difference in time, so that cable-istic replies, or corrections, might be sent if need be, and oftentimes prevent the spread of wrong and vexatious information. For ordinary state purposes, and the better control of the Fleet, &c., the argument is in favour of the West Indian Colonies being at a less distance—by time—from the Mother Country. In short, a quicker means of communication than at present exists is desirable, to say nothing of a cheaper; and if thereby only an alternative route be provided, great benefit would result therefrom. Great Britain with its *ten* cables to the United States, is always *en rapport* with America, upon every question of interest to the whole commercial community; and as to a daily

summary of the world's news, why the Press Association of London would so improve upon our present American supply as to gladden the heart of every merchant, and give our local Editors room for enterprise, of which they are now unable to afford us illustrations. But as matters are, the large number of times a message has to be repeated precludes the possible hope of lengthy messages ever being sent from England to the West Indies. Passing over so many separate Company's lines, necessitates, as a matter of course, delay and a total heavy charge; though no single one out of the ten or eleven Companies, can claim a very large sum, even out of the fourteen shillings per word, now demanded.

So far as can be gathered by the writer from the public sources open to him—and one of the latest is to be found in the November number of the *Leisure Hour* for last year—a message addressed to London is sent by Demerara to Trinidad (1); thence to Santa Cruz (2), [provided the through cable between those two points be in good working order, otherwise it must percolate “up the Islands” to the station named], and in succession to Santiago de Cuba (3), Havannah (4), Key West (5), Punta Rassa (6), Lake City (7), and New York (8). There is then the link betwixt that city and Newfoundland (9) to be wired over, before it is ready to be cabled across the Atlantic to Valentia in Ireland (10). Then by one last operation through the Irish land lines, the cable across the Irish sea, and the land lines from South Wales to London—all leased from the British Postal Telegraph system,—the message is finally received in London (11). After such a journey, and passing as it must through so many different hands, the feeling excited is rather one

Present Telegraphic Route with proposed New Line.



of wonder and thankfulness, that, as a rule, messages arrive with so few serious errors in them. This proves that the fault is not with the staff, but rather with the system which is wedded to so roundabout a route between Demerara and London. London is in a far better position to supply us with American news, plus its own, and European news generally, than the United States ever could be with regard to London, &c.; and therefore, as the best market for news is the Metropolis of Great Britain, towards that spot should our cable steamers point when laying any new cables from Demerara, rather than in the opposite direction. Further the British Government is now engaged in taking over, and working, the cables that touch its shores, and a scheme has also been hinted at of direct communication by cable between the Colonies and the Mother Country.

But a protest against things as they are is not sufficient. It is necessary to go a step further, and to boldly answer the question arising to every one's lips, "Can a better route be suggested?" Having given this matter considerable attention and thought, I am convinced that such a route is feasible.

In the skeleton map attached there is shewn the present cable connections, and also the suggested new route (with dotted line) for communication with Great Britain. It will be seen that there already exist duplicate lines of cables from Great Britain to Pernambuco, touching at Madeira, and the Cape de Verdes. In 1874 there was actually laid, and, for six months, worked, a cable between Demerara and Para, with a connection into Cayenne (French Guiana). It gave out at the end of the time named, and has never since been repaired. Now instead

of following the coast plan to Pernambuco, I would suggest the laying of a direct cable between Demerara and Cape de Verdes, thereby avoiding the delay and cost of sending telegrams over the Brazilian lines, before being fairly started across the Atlantic. The distance it will be observed between Cape de Verdes and Georgetown is not much greater than from Cape de Verdes to Pernambuco, which is recorded as 1844 knots. It may therefore be taken roughly as 2,000 knots from Cape de Verdes to British Guiana. Now, if a cable were laid between the points named, Demerara would be placed by that single connection, within easy telegraphic reach of Spain, France, Great Britain, &c. ; and through these countries, to all parts of the world. Besides, there would be, through Cape de Verdes, almost direct communication with Pernambuco (but one transmission at Cape de Verdes) for the Brazils, River Plate, Chili, Ecuador, and Panama, into Mexico ; and even finding in that way a new route into the United States itself. Panama would also by this route give a new outlet to messages for Jamaica, &c. ; and should the proposed new French cable be laid from Cayenne to San Domingo and Jamaica, messages could then be conveyed to the French Guiana, which now appears quite cut off. Further, Para and Venezuela would also be opened up to Demerarians at a cost very trifling to that now charged, as a message has to traverse the route outlined above to reach Great Britain, and then to pass over the cables to Cape de Verdes and Pernambuco, before reaching its own lines proper.

From an electrical and engineering point of view the proposed single cable between Georgetown and St. Vincent, Cape de Verdes, would at least be equal to the single one

now at work between Georgetown and Trinidad—though it is always advisable to duplicate each route, for however smartly our cable ships can now repair these lines, under the sea, time is always involved, and telegraphic isolation is a thing to be avoided as far as possible. British Guiana has had its little experience of this silence to the outer world, as witness the recent reduction of subsidy to the existing Telegraph Company, by the Court of Policy. That there is dissatisfaction with the present cable communication with Great Britain was shewn by the influential Conference that met at Barbados in the year 1881, to which British Guiana sent its representative in the person of the Hon. W. F. HAYNES SMITH. The outcome of that gathering was, not only to express its disapproval of things as they were (and now are); but to recommend a scheme for connecting the West Indian Islands and Colonies with Nova Scotia, *via* Bermuda. Now Demerara is not specially interested in opening up telegraphic communication with Bermuda, and hence that scheme would not be of much benefit to the colony over the present one. The cost was to be the good round sum of one million pounds sterling, and it was proposed that the Home Government should contribute the sum of three hundred and fifty thousand pounds thereto, and the Colonies—including Jamaica, British Guiana, Trinidad, Barbados, and the Leeward Islands—with Bermuda, the remaining six hundred and fifty thousand pounds. The Imperial Government, however, after referring the matter to the Postmaster General, did not approve of the scheme, and the Engineer in Chief of the British Postal Telegraphs—than whom I do not know a more competent authority—pointed out the

difficulties in the way of the proposal, as also the fact that its adoption meant the extinction of the existing Telegraph Company.

In the result the Government declined to sanction it, notwithstanding that they recognized the need of better communication. Even if it had been adopted there would still be the gap across the Atlantic not in the hands of either the Colonies, or Great Britain; and thus one of the vital points now sought for by the Imperial Government would be lost, viz: *to have the Telegraph Cables as much as possible in the hands of the Government, by the shortest routes.* Five thousand miles of cable was proposed to be obtained, and laid, and a large supply of new instruments were to be provided for all the new stations. With the modest proposal now put forward only some two thousand miles of cable is asked for, and instead of a solid million the sum required would be about a quarter of that amount, viz., two hundred and fifty thousand pounds. The up-keep, or maintenance, would be of the cheapest possible kind, as there would be an absence of heavy shore ends—the cable to Cape de Verdes being in one section and without any intermediate instruments. On the same grounds it is to be assumed that the cost of working would be less, a matter of economy not to be lost sight of. As to the probable price of messages over the proposed route, let us take the rate now in force between London and Spain. The length of cable is eight hundred and eighty six knots, and the cost per word is only fourpence-halfpenny. From Lisbon to Cape de Verdes is one thousand eight hundred and nine knots which would be the point of


departure for the new cable. Counting the distance thence to Demerara as two thousand knots more, then we have a means of approximating *a price which will be certainly below the half of fourteen shillings*. A simple rule-of-three sum gives us the result as about two shillings per word. If, however, a five-shilling or even seven-and-sixpenny rate, could be adopted with a quicker service, great benefit would result. The lessened number of transmissions also would greatly aid more rapid delivery; and we might then reasonably look for summaries of the overnight's Parliament, in our daily newspapers. London might even wire as far as Cape de Verdes, and if such were the case the transmission there, instead of the list given above, would place Demerara telegraphically as near to London as we now are to Suddie.

Such a scheme is, I think, enticing enough to arouse new energy, and enterprise, in the existing Telegraph Company; or it might invite separate Colonial co-operation for the common benefit of Demerara and the West Indian Islands.

NOTE.—Since the above was written Mr. HENNAKER HEATON, M.P., read a paper before the Colonial Institute, London, strongly advocating cheaper postal and cable rates between Great Britain and her Colonies. He however considers that "Australasia" embraces the whole of the Colonies of the Mother Country, for he did not even name the West Indies in his list of cable rates charged from London. It is therefore all the more necessary for the West Indies to look after themselves, and at present I see no more promising scheme of quick and cheap cable communication than the modest one here advocated.

*The Beetles of British Guiana.**

By the late Rev. William Harper, M.A.

HE natives of the temperate regions of the earth are, as a rule, but little troubled by insects, and generally take very little notice of them. With the exception of being occasionally bitten by a bug or flea they are rarely annoyed by them, but when they come into tropical regions like British Guiana the case is different. Here the new-comer is at once assailed by mosquitoes which suck his blood, inject poisonous matter into his flesh, and disturb his slumbers by their perpetual buzzing.† His hands and feet are not unfrequently attacked by chigoes attempting to build their nests, or rather to deposit their eggs in them. He soon finds that his rooms are overrun with ants of different sizes, which attack everything edible, that the binding on his books and blacking on his shoes are eaten off by cockroaches, that the posts and beams of his house are being reduced to hollow tubes by termites or white ants, that every corner of his house is invaded by spiders, that some of the trees in his garden are stripped of their leaves by ants, and that others are bored or striated by beetles.

* Examples of the greater number of species referred to in this paper, are on view in the British Guiana Museum.—ED.

† This popular supposition that a mosquito injects a venomous liquid into the subject attacked, seems to be based on the fact of the local irritation caused by the puncture. Up to the present time, no Dipterous insect has been shown to possess glands for the secretion of such poisonous matter; and the irritation is most likely due to the laceration caused by the barbed mandibles.—ED.

People naturally complain of such insects as nuisances, and think more of the injury they do or the trouble they give than of the habits of the insects themselves or of the part which they play in the economy of nature; and still entomology is a very interesting study, and so fascinates some of those who devote themselves to it, that they sigh because life is so short and entomology so long. British Guiana affords those who live in it, and more particularly those who spend a good deal of their time out of doors, many favourable opportunities of studying this subject. In a paper like this I can only notice briefly a few of the salient points of the science, hoping that this short and imperfect sketch may induce some of those who read it to look farther into the matter.

Since the time of LINNÆUS the *Coleoptera* or Beetles have stood at the head of the insect division of the animal kingdom. They are sometimes said to be among insects what the lion and the tiger are among quadrupeds, or the eagle among birds, and are marked by the compactness, solidity and symmetry of their structure. Their great size as insects, their fantastic forms, and the diversity of their colours, some of them being very brilliant, attract attention, while the fact that they are easily preserved in living beauty has long rendered them favourite subjects of study. This order contains some of the largest and probably also some of the smallest insects in existence. Certain of the *Phasma* family are longer than any beetle, and some of the larger butterflies and moths are broader across the wings, but if we take length, breadth, and thickness together, no insect approaches the larger beetles in massive bulk. British Guiana is comparatively rich in beetles.

This is mainly owing to the fact that it has a luxuriant vegetation which in its moist tropical climate decays and is renewed very rapidly. The term *Coleoptera* (wings in a sheath) is derived from two Greek words *koleos* a sheath, and *ptera*, wings, and has been applied to beetles since the days of ARISTOTLE (384-322 B C.). Though not strictly applicable in every case, it is on the whole the best word that can be got. As my object is merely to notice some of the more conspicuous species and groups, I cannot undertake to confine myself to any scientific arrangement, but I hope that the system which I adopt will enable readers to follow me and remember something of what I write.

Beetles are sometimes classed according to the number of joints in their tarsi or feet. For this purpose the Greek word *meros*, a joint, is used with a numeral or an adjective, or both prefixed to it. In this way we get *Pentamera* (five-jointed), *Tetramera* (four-jointed), *Trimeria* (three-jointed), *Heteromera* (unequal-jointed), and *Pseudotrimeria* (false three-jointed.) The characters of the antennæ or feelers of beetles are also used in classification. In this case the Latin *cornu*, a horn, is generally adopted, and some qualifying word prefixed to it. This is the origin of such words as *Lamellicornes* (leaf-horned), *Serricornes* (saw-horned), *Clavicornes* (club-horned), *Longicornes* (long-horned), and *Pectinicornes* (comb-horned).

A number of interesting beetles are included in the *Pentamera*, some of the largest of which come under the sub-division *Lamellicornes*. In this division are the *Scarabæidæ* or dung-eating beetles which have their type in the *Scarabæus* or sacred beetle of the Egyptians.

Some of the largest beetles of this genus are met with in British Guiana. The largest and in some respects the finest beetle of this genus which I have seen here, is the *Scarabæus hercules* or Hercules beetle. It is sometimes nearly six inches long, and the head of the male has on it a long thick horn armed with two or three teeth, and bent downward towards the point. Its head and thorax are black, polished and shining. The elytra or wing-cases are said to be sea-green, and this may be so in the living insect, but all the specimens I have examined were dead and in every instance the wing-cases were ashy grey peppered with black spots.* I have not seen any of them about the coast, but they are met with in the interior of the country, and they are also found in the Antilles, and as far south as Rio Janeiro. These beetles are now generally classed with the *Dynastidæ*, i.e., powerful beetles on account of their great size and strength.

The *Megalosoma* or big-bodied beetles, which also belong to the Scarabæan family, have not a few formidable representatives in British Guiana. First among these comes the *Megalosoma elephas* or elephant beetle, which is a formidable looking insect, being sometimes from four to five inches long and two inches broad. Its head is well-developed and armed with a horn about two inches long, bent upward like the letter C, and boldly forked at the point. Its front legs are arched horizontally. The ground colour of this insect is black, but the most of its body is covered with a yellowish grey, thick set down.

* A specimen of this beetle in the Museum still shews the green of its natural colouring, but it is toned to a greenish grey.—ED.

The *Megalosoma actæon*, another beetle of this genus, closely resembles the insect described above, but is slightly inferior to it in size, and has a wrinkled surface. The classical proper name Actæon has been applied to this insect because its horn resembles that of a stag, ACTÆON being a famous hunter who, fable says, was changed into a stag by DIANA. Beetles of this genus are sometimes called *Oryctides* from the Greek word *Oryx*, a long-horned antelope. Both the species which I have noticed above are sometimes found about the mouth of the Essequibo, and occasionally in Wakenaam and the Troolie Islands.

The *Strategus* or *Scarabæus alæus* which also belongs to the family of the Scarabæidæ, is rather an imposing beetle, being about an inch and a quarter long, and three quarters of an inch broad. This beetle bores into the earth, and if it gets under young cocoanut trees kills them. In young cocoanut plantations it is often very destructive and if not carefully watched might kill every plant. It is generally brought to the surface by pouring oil or strong lime-water into its hole. Though apparently able to breathe in water, it cannot breathe in oil or water saturated with lime, and consequently when its hole is filled with either of these fluids it has to come out and may then readily be destroyed. *Strategus* is a Greek word meaning General, and possibly when the Rev. F. W. HOPE gave the beetle this name he had in his mind some General like Prince MAURICE of Nassau, whose favourite method of taking strongholds was by digging mines or subterranean passages under them. ALÆUS was the reputed father of the giants who threatened the Olympian gods with war, and the term

has been the specific name of this insect since the time of LINNÆUS.

The *Phanæus* is another genus of this family, and all its species are remarkable for the variety of their size and colour. *Phanæus* means conspicuous, and appears to have been applied to this genus of beetles on account of their fine colours and strange forms.

The *Phanæus lancifer* is a very fine beetle, being often about an inch and a half long, rather more than an inch broad, and having a thick massive body. Its head is black and has on it a long angular horn bent backward, hence it is called *lancifer* or lance-bearer. All the upper side of this insect except the head is violet, having a green reflection in certain lights. This beetle is said to be rare, the British Museum possessing only one specimen which was brought from Para by Mr. BATES. I have had one or two specimens in collections which I made here, but they were comparatively small. There are several other species of *Phanæus* in British Guiana, and the *Coprides* or Dung-eating beetles (from *kopros*, dung), which closely resemble the *Phanæus* in their habits, and of which there are several species here, are sometimes included in this genus.

Some of the beetles of the Scarabæan family are called *Geotrupes*, i.e., earth-borers (from *ge*, the earth, and *trupæin*, to bore). The *Geotrupes stercorarius* is well known here. It is a fair-sized beetle, black above, tinged with violet on the margin and steel-blue below. Its wings are deeply striated.

The Hardbacks which sometimes invade our houses at night also belong to the Lamellicorn tribe, but I suppose they are so familiar to every

one that a description of any of them is quite unnecessary.

The *Lucanidæ* or Stag-beetles which form the second division of the Lamellicornes, have but few representatives in this part of the world, though the *Lucanus ibex* appears to be common in Brazil. LINNÆUS was inclined to include the Passalides in this family and called *Passalus interruptus*, *Lucanus interruptus*, but this group is now looked upon as a connecting link between the Pectinicorn and Lamellicorn Beetles. The finest of the Passalides is the *Passalus interruptus*. This insect is about an inch long and has a shining black colour, though about the upper part of the head there is a good deal of silky golden down which sometimes gives an orange tinge to that part of the insect. Its wing-cases which turn somewhat abruptly over its body, are marked by ten striæ on each, and as the stria which runs from the shoulder on each elytron, extends only half-way the beetle has received the specific name of *interruptus*. *Passalus* means a wooden pin for boring, and is probably applied to this insect on account of its penetrating into decaying trees, for both larva and beetle live in rotten wood. I have observed that some of the large species of this genus make a strange hoarse sort of noise for sometime after they are caught. I suppose there are about eight or ten species of this beetle in British Guiana. All the species I have seen resemble this one, having elongated black shining elytra striated longitudinally, but they are all smaller and some of them much more active.

The Serricornes which are another important subdivision of the Pentamera, include a number of fine

beetles though they are inferior in size to some of those already noticed. This section contains among other things our fire-flies or luminous beetles such as the *Elaterides* and *Lampyrides*. The phosphorescent organs of these insects consist of a mass of spherical cells filled with a substance finely granulated, and surrounded by numerous tracheæ or air-tubes. In daylight these organs have a sulphurous appearance, but in the dark they shine something like a candle. The light is supposed to be caused by slow combustion, sustained by air passing through the trachea. The *Elaterides* give out their light from two yellow spots on the lateral margin of the thorax, but, when they fly, they exhibit a brighter light on the hinder part of the thorax below. One may sometimes get a glimpse of this light by putting the insect on its back and irritating it. The *Lampyrides* emit their light from the last segment of the abdomen which is covered with a very thin skin.

Elater is derived from the Greek word *elater*, a driver, and the name is given to this family of beetles, because they are capable of making a sudden leap by a quick motion of the articulation between the thorax and abdomen. Probably the most remarkable, though not the largest of this genus, is the *Elater noctilucus* sometimes called *Pyrophorus* (i.e. Fire-bearing) *noctilucus*. It is about an inch and a half long, and illustrates in a forcible manner, the light yielding powers of this family. Its prevailing colour is brown, but it has two yellow semi-transparent spots on the sides of its thorax from which there issues in the dark a rich mellow light. When it flies, a brighter light is seen under its thorax. This is the finest fire-fly with which I am

acquainted. It does not give out any light after it is dead, but, if the luminous matter is taken from it immediately after death, and put upon paper, it will for a time shine like phosphorus. There are other luminous species of this genus which give out their light in the same manner as the above, but all that I have seen in this part of the world are inferior to it in size and • brilliancy.

The *Elater porcatus* is even more bulky than the *Elater* already described. Its body is shining black, but this colouring is somewhat concealed by white and green scales. The under surface of its body and its legs are green if the scales have not been rubbed off them. Its elytra or wing-cases are deeply striated, and the furrows generally filled with white scales. I have watched it closely for hours in the dark, and never saw it give out any light. It is sometimes found on the trunks of trees, but it often flies slowly in mild weather with its body nearly perpendicular, and may be caught on the wing.

The *Lampyrides* are a family of the *Malacodermes* (from *malakos*, soft, and *derma*, a skin) or soft-skinned Beetles, and includes the *Lampyridæ*, Glow-worms and the *Telephori*, Soldier and Sailor Beetles. *Lampyris* is derived from the Greek verb *lampein*, to shine, and the glow-worm should be an object of interest to Englishmen. Many of us must remember having read in our school-boy days the tale of the Nightingale and the Glow-worm. The *Lampyrides* resemble the *Elaterides*, but have more flexible wings and softer bodies, and are inferior to them in size. Their bodies are elongated, generally slender, and somewhat compressed. Their head is, as a rule, buried in the thorax; their antennæ

eleven jointed and inserted on the front of the head rather closely together.

I am not aware that I have seen any insect of this family here more than half an inch long, though some of them are said to be longer. The *Lampyris phosphorea*, LIN; and the *Lampyris ignita*, FAB., are most commonly met with in British Guiana, and may be picked up almost anywhere. Three species of this genus, viz., *Lycus serratus*, *Lycus tricolor*, and *Lycus limbatus*, were placed by FABRICIUS among the Lycidæ (from *lukos*, a wolf) or "wolf beetles", but subsequent writers have changed the generic name of these beetles. The home of the wolf beetles is Africa. The luminous Lampyrides only emit light from the last segment of the abdomen, and this light is almost always fitful or twinkling, and much feebler than that given out by the Elaterides. When the earth is enveloped in sable night, the fire-flies often form one of the most striking features of the tropical landscape. When a traveller from the temperate zones arrives in the tropics, he is almost at once struck by the size and brilliancy of the stars which shine in the tropical sky, and has thus suggested to his mind TENNYSON'S beautiful lines:—

"Larger constellations burning, mellow moons and happy skies,
Breadths of tropic shade and palms in cluster, knots of Paradise".

As soon, however, as he begins to view the landscape after dusk he discovers that it too has its stars. The first sight of the tropical fire-flies strikes all new comers with wonder. I have sat for hours in the gallery of one of the mountain residences among the hills of Jamaica during a moonless night in the rainy season, and watched the varied lights on the landscape and sky

without being able to decide which was the finer, or which should be the more admired. There are some beautiful allusions to fire-flies on the landscape in the second part of SOUTHEY'S "Madoc" and other poetical works, and from among these I have selected the following lines which have been quoted oftener than once, for insertion here :—

"Sorrowing we beheld

The night come on, but soon did night display
More beauties than it veiled, innumerable tribes
From the wood-cover swarmed, and darkness made
Their beauties visible; one while they streamed
A bright blue radiance upon flowers that closed
Their gorgeous colours from the eye of day;
Now motionless and dark eluded search,
Self-shrouded, and anon starring the sky,
Rose like a shower of fire".

The *Buprestidæ* also belong to the serricorn sub-division, but unlike the *Elateridæ* they are incapable of leaping. The word *Buprestis* is derived from the Greek words *bous*, an ox, and *pretho*, I inflame. These insects are distinguished by their bright metallic colours, azure, emerald, and gold. They were known to the old entomologists as *euchroma*, i.e. beautiful colour. The most important species of this insect so far as British Guiana is concerned, is the *Buprestis gigantea* of which there are several varieties. The typical form comes from Cayenne, and is most common in collections. Another form is found in Para, and a third in British Guiana. This beetle is oval-shaped, nearly two inches long and about an inch broad. Its elytra or wing-cases are of a brilliant copper-colour with marginal and sutural regions green, but its whole colour varies a good deal according to the light in which a specimen is viewed. The Indians

use the wing-cases of this handsome beetle in making ornaments. Tearing the elytra from the back of the insect they pierce them with a hole at the humeral angle, and thread them on strings like beads. In this way they make for themselves anklets, armlets, and necklaces. From an examination of the wing-cases in one of these ornaments which I sent to Dr. GRIERSON'S Museum in Thornhill, Scotland, Dr. DAVID SHARP concluded that more than one variety of this species of Buprestidæ might be found in Demerara.

The Tetramera or Four-jointed division of beetles contains among other things the *Curculionidæ*, *Rhina*, *Rhynchites*, and *Rhynchophora*, i.e. Weevils and Snout-bearing Beetles, among which are some of the most destructive insects of the Beetle Family. Prominent among the Weevils of Guiana is the *Calandra palmarum* or Palm Weevil which often commits such havoc among our palm trees. This beetle is rather more than an inch long, and has a strong beak. It deposits its eggs in the soft parts of the stem of cocoanut trees, near the top, where they are soon hatched, and the larvæ are protected and concealed by the imbrication of the lower part of the fronds. These insects are very voracious and eat vigorously into the soft stem of the cocoanut tree, their presence being generally unknown, until the branches of the tree begin to droop and fall off. This is the reason why the stems of some of our cocoanut trees are striated vertically with rough irregular furrows. In many districts the cocoanut trees have to be watched, and periodically cleaned to prevent their being destroyed by this insect. When full grown the grub is from two to three inches long and is either of a flesh colour

or a dirty white. I have seen more than a dozen of these grubs taken out of one cocoanut tree. The loss which a cocoanut farmer suffers from the attacks of these insects is often very serious. In order to get rid of them, branches and bunches of unripe cocoanuts have often to be torn off, the trees are generally weakened by their depredations, and if they are not dealt with in time the insect eats into the heart of them and kills them. Lamp oil, fine salt, and lime are often used to drive and keep them away. When about to enter the chrysalis state they weave for themselves neat oval cocoons with stripes torn from the stem of the cocoanut tree. This grub is known as the Gru-gru worm, and is said to be eaten alive by the natives like an oyster, but, though I have heard and read of this, and it may be quite true, I have never seen any body eat one. They evidently attack other palms besides the cocoanut. I have seen the beetles assemble in numbers when a mountain cabbage tree was felled, and I understand they attack the sugar-cane.

The *Rhina barbicornis* or Bearded-beaked Weevil belongs to the same family as the insect described above. It is readily distinguished by its hairy snout and long slender legs. When looked at with the naked eye this insect appears to be striated and speckled, but I understand when viewed through a microscope it is found to be richly decorated. It is smaller than the Palm Weevil, but varies very much in size. I have not seen this insect in Wakenaam or Leguan, but have met with it in Fort Island.

The *Calandra saccharia*, Sugar Weevil, or Cane Borer also belongs to this family. It is a comparatively

small beetle, being rarely more than half an inch long, and rather slender. Its colour is yellowish brown dotted with dark spots. Though it generally attacks the sugar-cane I have found it on other plants, but it prefers plants which exude saccharine matter or sweet juice. I understand this insect does very little harm to the sugar-cane plant itself, but it not only consumes the cane-juice, but also damages any of it with which it comes into contact to such an extent that it will only make molasses. When juice damaged in this way is even mixed with sugar it is a very serious matter and one never knows what his strike of sugar may be worth.

I might mention many other destructive beetles of the Weevil Tribe, for I scarcely know a useful or ornamental tree which has not its enemy in the shape of a weevil or borer. The illustrations, however, which I have already given may enable readers to find borers or weevils for themselves. I shall, therefore, conclude my remarks on this family of beetles by a short account of the following weevil: Some years ago Mr. HENRY TAYLOR, then missionary at Buck Hall, in Essequibo, called my attention to the fact that in some of the beans of the locust-tree there is a beetle about the size of a small pea, though there is apparently no hole in the shell of the bean through which it can enter. Having satisfied myself that this was the case I forwarded one of these beans to Dr. DAVID SHARP, who observed traces of a small puncture near the stalk, through which he inferred the mother had inserted an egg when the bean was young and its shell soft. In the same bean he discovered the chrysalis of a moth, and a small parasitic Hymenopterous insect, a fair variety of insects in so small a world,

- This weevil is the *Cryptorhynchus stigma*. It is yellow with black spots on the wing-cases. I have obtained another fair-sized weevil of the *Cryptorhynchus* family which I am informed is deposited in the same way in a larger locust-tree bean found about the foot of Roraima. The prevailing colour of this beetle is brown, but it has four irregular yellow spots on each of its elytra
- and one on each side of its thorax. *Cryptorhynchus* is made up of two Greek words meaning "hidden-snout," and the name is given to this family of weevils, because they are capable of concealing their snout by bending their heads downwards and fitting the snout neatly into a deep groove on the under surface of the thorax. When these insects are disturbed they are in the habit of dropping from trees and disguising themselves on the ground, where they remain motionless until the cause of their alarm has passed away. In this way a long-legged, long-nosed weevil can, by drawing its legs under its body, and bending its head downwards so as to bring its beak into the groove under its breast, in a moment assume the form of a pebble or fallen seed. In this disguise it is often not easily detected even by those acquainted with it.

The *Longicornes* or long-horned beetles are another important section of the Tetramera, their most prominent family being the *Prionidæ* (from the Greek *prion*, a fan) or Sawyer Beetles. Probably the most interesting species of this genus is the *Prionus cervicornis* or deer-horned sawyer. This is a large flattish beetle varying a good deal in size. The specimens which I have seen here are from two to three inches long and rather more than an inch broad, but I understand much larger speci-

mens are found.* The first thing which one notes about it are its formidable mandibles, which are longer than its head and thorax together, bent or arched inward towards each other, and each armed with seventeen sharp teeth, the tooth in the middle of each jaw being longer than the rest. Its head and thorax are of a rusty brown colour and the latter is armed at the sides with three sharp spikes. The ground colour of its wing-cases is a dark brown striped longitudinally with numerous narrow bands of reddish yellow which interrupt and run into each other. This gives the insect a very picturesque appearance. The under part of its body and its legs are of a tame rusty colour. This insect is said to seize the twigs of trees and shrubs between its powerful jaws, and to whirl its body round and round until it cuts them through. Both WATERTON and LACORDAIRE believed this, though neither of them seems ever to have seen the beetle cut off a twig. I have myself once or twice seen twigs in the bush which appeared to have been sawn off their tree or shrub by something, and only the other day when waiting for the tide at the mouth of a small creek about twenty-five miles up the Essequibo I saw an apparently healthy green twig fall quietly from a height of about thirty feet into the water below. A native who was with me at the time assured me that the twig had been cut off by a sawyer-beetle of which he had given me a specimen the previous day. The mouth of the creek was so encumbered with mud, fallen trees, and bush, that I found it impossible to get near the twig

* A specimen of this beetle, presented to the British Guiana Museum by Mr. JOHN WILKIE, measures more than six inches in length.—Ed.

or the tree. The specimen which my friend, the native gave me, asserting that it was the true Sawyer Beetle, is not a large beetle, and closely resembles the *Lamia subocellata*, though apparently a different species. There is a very general opinion that there is a Sawyer Beetle, but I scarcely think that people are agreed as to which beetle it is, or what is the nature of its operations. It is quite possible that there are more than one.*

The *Prionus corticinus* or Bark Sawyer is about an inch long, is somewhat depressed, and has elongated wing-cases nearly the same breadth throughout its length. Its prevailing colour is brown, but in some parts it appears to be yellow. It is more commonly met with here than the previous beetle.

The *Cerambycidæ* (from the Greek *kerambux*, a kind of horned beetle) or Horned Beetles resemble the *Prionidæ* in the general appearance of their bodies, but, though their antennæ are long, their mandibles are about the normal size and nearly alike in both sexes, while

* After making all possible allowance for the fact that there may be more than one beetle which cuts off the twigs of plants, there scarcely seems reason to doubt that the reputed sawyer beetle is the "*Prionus cericornis*," since it is the most likely beetle here which, from the structure and size of its mouth parts, can be considered able to cut through the comparatively large branches which are said to be cut through by the beetle and which give every indication of being cut through by such an agency. I have been assured by a bushman who has seen the beetle at work, but at such a height that it has always been impossible to procure the specimen, that instead of whirling its body round and round by means of its wings, the sawyer beetle after seizing the branch between its long and toothed powerful mandibles, simply walks round and round the branch. Possibly the insect steadies itself by means of its unfolded wings while thus engaged.—ED.

among the Prionidæ the abnormal development of the jaws and teeth is confined to the male sex. This family of beetles is largely represented in British Guiana. The *Cerambyx barbicornis*, called by LATREILLE *Lophocercus barbicornis* from the Greek *lophos*, a tuft, and *keras*, a horn, belongs to this family. The five lowest joints of the antennæ are covered with tufts of blackish hair; the apexes of these joints and the six naked joints towards the extremities of the antennæ are yellow. Its head and thorax are dull yellow, spotted with black, and its wing-cases are black, variegated with reddish yellow. It is seldom met with on the coast, but may be found a short distance inland.

The *Chlorida festiva* is a handsome green beetle of this family which sometimes makes its appearance in our houses in the evening.

Another interesting section of the Longicornes is the Lamaria (from *lamia*, a witch). This family differs from the former mainly in the structure of their head and palpi. The most singular of these is the *Acrocinus longimanus* or Harlequin beetle. On looking at it, one is struck by the disproportion of its parts and the grotesque variety of its colouring. Its antennæ are about twice as long as its body and its front pair of legs are fully as long as its antennæ, hence it is called *longimanus* or "long-handed." Its ground colour is black, variegated with red and grey mixed somewhat like the dresses worn by the stage clowns, from which circumstance it is called the Harlequin beetle. There are two triangular patches of red on its head, and two lines of red on its thorax; there is also a band of red on each of its legs near the second joint, and its wing-cases are

ornamented with waving lines and angular figures of red and grey. Its thorax and elytra are armed with spines and its under part is covered with down of a grey colour. It is said by Mr. DUNCAN in the *Naturalist's Library* and also by the Rev. J. G. WOOD in his "Insects Abroad" to be very fond of the juice of a yellow-wooded tree called the *Bagassa Guianensis*, but I have never seen any one who could tell me what this tree is.

The *Lamia subocellata* already referred to belongs to this family. It is a fair sized beetle of a brownish black colour covered with a silky down. A stripe of yellowish white runs down the centre of its head and thorax, and its wing-cases are marked with round spots of the same colour. I have already noticed the resemblance between this insect and one of the reputed sawyer beetles. If these beetles really cut twigs, which they may do to get at the sap of trees and shrubs, I think, they must use in doing so the acute spines on their thorax.

The *Cassidæ* or Tortoise Beetles are another family of the Tetramera. Their name is derived from the Latin *cassis*, a helmet, and is given to these beetles because their thorax is helmet-shaped. They are generally flattened and spherical, their outer shell overlapping the body, so that the legs can be drawn completely under it. The species are numerous and in some cases highly ornamental. The *Cassida barbicornis* is sometimes found here. It is a small bluish green beetle with black antennæ. Its wing-cases are punctured and have a long obtuse spine projecting sidewise from each shoulder. The *Cassida perforata* also found in British Guiana is a somewhat singularly shaped insect. Its colour is yellowish red, dull above, but shining beneath. It has a

short transverse thorax tapering to a sharp point at each side. Its wing-cases are nearly triangular, and ending the thorax form an acute point at the basal angle. There is also a perforation at the base of each of the elytra from which the insect receives the specific name of *perforata*.

The *Cassida luctuosa*, another of our beetles, is a small roundish insect, nearly black on the upper side, but reddish towards the edges of the wing-cases and below. It has a short thorax running into very acute angles at the sides.

The *Cassida sexpustula*, which is sometimes found here, is nearly circular in exterior outline, and is green above, and black below. • •

The *Cassida discoides* is a green beetle with large yellow spots running across the middle of its elytra. These are some of the better known Cassidæ met with in this part of the world, but a number of other species are found here.

We have also several beetles of what is called the Eumolpus family. The word *eumolpus* means "good-singer," and is a very strange name to give to a voiceless beetle, for it neither gives us any idea of the appearance of the insect nor of its habits. It is also a proper classical name. These beetles do not differ very much from the Cassidæ, and are sometimes classed with them.

The *Doryphora* (from the Greek *doru*, a spear or spike, and *phero*, I carry) or spike-bearing beetles are easily distinguished from their kindred genera. If one looks at a specimen from above he sees no spike or spear, but if he looks at the thorax or breast below he at once perceives that the middle of it projects in a sharp

spike-like form. Some of these beetles are very prettily marked, and are worthy of notice on account of their colouring. The *Doryphora tessellata* which is found in our neighbourhood, though I have never seen a specimen of it here, is one of the finest of these. Its ground colour is yellow, and its elytra are crossed by five rows of square chestnut spots. The thorax is plain chestnut.

The name *Chrysomelides*, i.e. "Golden Apples," is sometimes given to beetles of this sort. As their figures are rounded, and their colours rich, this name is rather appropriate, but it has been somewhat capriciously used. There is a considerable quantity of these insects here, and they present an agreeable variety of colours such as scarlet, azure, gold, and green, brought out with lustre. They are all plant-eaters, and some of them are gregarious in their habits.

The Trimeræ, Three-jointed, or as the Rev. J. G. WOOD has it, Pseudotrimeræ, False Three-jointed, is another general division of Coleoptera. Mr. WOOD asserts that, though the tarsi of these insects seem to have only three joints, they have really four, the third one being very minute, and hid in the doubly lobed end of the second. This division contains a somewhat miscellaneous collection of beetles, and some of the families in it appear to be but slightly related to one another. The families or groups with which we have mainly to do at present are the *Erotylidæ* and *Coccinellidæ*. *Erotylidæ* means "little darlings," being derived from the Greek *erotis*, darling. There are about 130 species of this genus, and most of them are small, and some of them are very beautiful. Their bodies are mostly oval and generally raised in the middle, and their antennæ

terminate in a flattened club formed of three points. The *Erotylus histrio* a somewhat cosmopolitan species, is often selected by authors as a type of this genus. It is about an inch long, and when looked at from above it appears diamond-shaped. Its ground colour is black, but its wing-cases are crossed by six or seven bands formed of confluent yellow spots. It has also a reddish spot on the shoulder and apex of each wing-case. There are a good many species of Erotylidæ in British Guiana, and M. LACORDAIRE, a brother of the great preacher of that name, who was well acquainted with the Coleoptera of this part of the world, has written an excellent monograph on this genus.

The *Coccinellidæ* are familiarly known to us as lady-birds. *Coccinella* is a diminutive of the Latin word *coccum* meaning a kernel or seed of a berry. These insects are small and closely resemble each other. There are said to be more than 1,000 different species of this family, but it is often very difficult to distinguish one species from another. They are semi-spherical in shape and their colour is generally red or yellow spotted with black. They are as a rule rather minute, but may be seen shining like gems on the leaves in our gardens after a shower of rain. Their larvæ are said to be very useful, inasmuch as they eat the plant-lice.

The *Heteromera* or Unequal-jointed beetles are considered by most authors the second general division of Coleoptera, but they are not very conspicuous among the beetles of British Guiana. Their four anterior tarsi have five joints each, and the two posterior ones only four. The habits of both the larvæ and perfect insects of this division are very diverse and do not appear to have been


well investigated. Some of them are found under the bark of trees, others in fungi, and others in farinaceous substances such as corn, meal, and biscuits. The latter are known to science as *Tenebrionidæ* or meal-worm beetles of which the *Tenebrio molitor* is the type. Most of the Heteromera hitherto observed in British Guiana have been placed in this family, but I believe that a careful scientific examination of the species met with here would be a benefit to Coleoptera.

Beetles like butterflies undergo complete metamorphosis, but the characters of their larvæ and chrysalides vary very much, and the changes which take place during metamorphosis generally occur in the ground or under the bark of trees and are not readily observed. Unless one has extensive grounds and plenty of time and patience he is not likely to make much of observing beetles pass from one state to another.



Mr. Froude's Negrophobia, or Don Quixote as a Cook's Tourist.

By N. Darnell Davis.

INCE ANTHONY TROLLOPE visited the West Indies and wrote *The West Indies and the Spanish Main*: a work which, by the way, may be classed with the brightest of his Novels: no Traveller's tale of this part of the Empire has excited such general interest as has Mr. FROUDE'S *The English in the West Indies, or the Bow of Ulysses*.

Mr. JAMES ANTHONY FROUDE is, *pace* Mr. FREEMAN, an Historian, and his fame as such is mainly founded upon his having discovered that, after all said to the contrary, that most dread Sovereign King HENRY VIII. was a highly respectable personage. It needs an exuberant imagination to whitewash so eminent a Blue Beard as was King HAL, but then, imagination was, and is, Mr. FROUDE'S strong point. Let any one who knows the West Indies well, but read *The English in the West Indies*, and he will readily admit that imagination plays a very active part in that Traveller's Romance. He seems, indeed, to think it only necessary to fancy his facts, and then to set them down as but truisms. To go into all Mr. FROUDE'S inaccuracies, and into all his contradictions of himself, is not the purpose of this paper, which will treat principally of the rampant Negrophobia displayed by that gentleman. At the same time, attention must be drawn to the grave

ignorance shown by Mr. FROUDE of main facts in the History of the English connection with the West Indies. Sir RALPH ABERCROMBIE was the Commander of the Expedition which captured Trinidad in 1797, but Mr. FROUDE says PICTON took the Island (p. 63). He says, in the same place, that until that conquest, the Island "was alternately Spanish and French," a statement wholly unfounded, as the French never held the place. It was in *Gros Islet* Bay, St. Lucia, that RODNEY collected his Fleet before giving battle to DE GRASSE, and not in the harbour of *Castries* as Mr. FROUDE imagines (p. 132). It was Sir SAMUEL HOOD who took possession of the Diamond Rock, and not Lord HOWE (p. 140). Mr. FROUDE fancies that DRAKE tried to take Havana and failed: and that PENN and VENABLES failed, in a similar venture (p. 291). DRAKE did not fail in any such attempt, as he made none, but he got the worst of it in an attack upon San Juan, Porto Rico, in 1595. As to PENN and VENABLES, Mr. FROUDE is evidently mixing up with Havana the disastrous attempt of those Commanders upon San Domingo. Lastly, DRAKE did not die in the Bahama Channel (p. 338). He died off Porto Bello, and his coffin was thrown overboard near a rock by the Castle of St. Philip, which stood opposite to Fort St. Jago. Mr. FROUDE tries to set the Barbadians right as to the origin of the name of their Island. The Islanders hold that a species of the *Ficus Indicus*, or banyan, which abounded in the Island, presented a 'bearded' semblance to the Discoverers. Mr. FROUDE says, "I disbelieve in this derivation. Every Spaniard whom I have consulted confirms my own impression that 'barbados' standing alone could

"no more refer to trees than 'barbati' standing alone
"could refer to trees in Latin. The name is a century
"older than the English occupation, for I have seen it in
"a Spanish Chart of 1525. The question is of some
"interest, since it perhaps implies that at the first discovery there was a race of bearded Caribs there."
(p.p. 38, 39). Now, the fact is that *Barbados* did not, originally, stand alone. The full name was *Los Arboles Barbados*, *The Bearded Trees*, as Mr. FROUDE may find set forth in Ramusio. As Mr. FROUDE'S life's work has been the writing of History, it might have been expected that, at all events, in his own particular line of study, he would have taken pains to be accurate, but, it is only too patent that *The English in the West Indies* is a mere piece of Book-making, containing no real study of the past History, and still less of the present life, of the English and African Races in the West Indies. Of the actual condition of the British West Indies of to-day Mr. FROUDE knows as much, and as little, as a Cook's Tourist, even when personally conducted, might pretend to. How could it be otherwise?

Mr. FROUDE arrived at Barbados on the 12th of January, 1887, and left Barbados for England on the 3rd of April following. In all, he spent 81 days in the West Indies, British and Spanish. Of this time, however, about 25 days were occupied in journeying to and fro between Jamaica and Cuba and in staying three weeks in the latter Island (p. 336). He contrasts the presence in numbers of the Spaniards in Cuba with the absence of Englishmen from the British West Indies, quite forgetful of the facts, that, the climate of Cuba is

much more like that of Spain, than is the climate of the British West Indies like that of the United Kingdom, and that Cuba is for the Spaniards, their Canada, Australasia, South Africa, and West Indies combined (pp. 292, 332, 363). Of the 56 days left to Mr. FROUDE for doing our part of the West Indies, he devoted a fortnight to Barbados (p. 109), the same time to Dominica (p. 172), and, apparently a week to Trinidad and a fortnight to Jamaica. Voyaging among the Islands gave him about a week on board Royal Mail Steamers, as to the officers of which he says, "never on any line in the world have I met with officers so courteous and cultivated." He seems to have spent about 12 hours at St. Lucia: just long enough for him to fall into the error of stating that St. Lucia is under the jurisdiction of Barbados (p. 136). At Grenada he was ashore for dinner, but, alas, his dinner seems to have disagreed with him, for, of this now flourishing little colony, which the Black Man, by industry, is turning into a garden, he preserves such painful reminiscences, that throughout his pages he holds up Grenada, not as an example, but as a warning. The late Sir GEORGE STRAHAN, when Governor of the Windward Islands, spoke of Grenada as a little Paradise, where everybody had plenty and everybody was happy; but then, with Sir GEORGE STRAHAN the Black Man was somebody, whereas with Mr. FROUDE the Black Man is nobody in the political system. Mr. FROUDE did not visit England's great West Indian Colony, British Guiana, on the Mainland of South America, although the Magnificent Province is within 36 hours steam of either Trinidad or Barbados.

In order to appreciate at their proper value the opinions

which Mr. FROUDE has formulated in his book, let us enquire what means he took to inform himself of the real state of affairs in the West Indies. In Trinidad he stayed with an official whom he indicates as Mr. G., and whom he describes as "a distinguished lawyer and member of the Executive Council of the island, a charming companion, an invaluable public servant, but with the temperament of a man of genius, half humorous, half melancholy, which does not find itself entirely at home in West Indian surroundings." As Mr. FROUDE'S mind seems to have received an unmistakable bias from his half humorous, half melancholy host, it is to be regretted that the full name of his informant has not been printed. Mr. GARCIA is the only distinguished lawyer in Trinidad whose name begins with the letter G., but he is neither an Official nor a person of melodramatic temperament. The last part of the description points to a type of official which is the bane of the West Indian Islands—the man who, obtaining his appointment by interest, holds high office rather than fills it; who does not identify himself with the interests of the Colony that feeds him, but is ever ready to take the best appointment that may be going. No large measure for the Public Good can be associated with the name of an official of this kind. Unproductive though he be, he is bound to extol himself at the expense of the colonists, of whom he knows little, and for whom he cares less. Whilst in Trinidad, Mr. FROUDE took no sufficient steps to learn what was the life of its people. There, as elsewhere, he does not judge for himself, but is content to be posted with the prejudices of others. His artless admission as to his mode of acquiring information is characteristic of

a man of books rather than of a man of the world. His own words are :—" In Trinidad, as everywhere else, " my own chief desire was to see the human inhabitants, " to learn what they were doing, how they were living, " and what they were thinking about, and this could " best be done by drives about the town and neighbour- " hood " ! (p. 73) CARLYLE, whom Mr. FROUDE has served as worshipper and iconoclast in turn, killed with ridicule the idea of respectability being founded upon a gig. It does not, however, require a CARLYLE to detect, in Mr. FROUDE'S idea of learning by " drives about", what men were thinking about, the mode of ' doing' places, of a Cook's Tourist, rather than the method of enquiry of a man of affairs.

So far from seeking, or making, opportunities for obtaining a knowledge of the true state of things in Trinidad, he devoted himself to admiration of the Flora of the Island, which he found quite as beautiful as his friend CHARLES KINGSLEY had depicted it, and man alone was vile. An exceptionally good opportunity occurred, during Mr. FROUDE'S short stay in the Colony, for learning something of the people of the place, the manner of men they were, and what their aspirations were. But, when formally requested to attend the Public Meeting held in Port-of-Spain in favour of the introduction of popular representation; a solid part of the Islanders desiring that some portion of the Legislative Council of the colony should be elected by votes of the Taxpayers, instead of, as at present, all the members being nominated by the Crown; he declined the invitation, on the ground that he knew too little of their affairs to make his presence of any value to the

reformers. Now, had he been a Statesman, instead of the mere pedlar in Politics that he is, Mr. FROUDE would have gone to the Meeting, not to assist at it, but, on his own account, to study the men themselves who were taking part in it, and to judge for himself as to the nature of the movement: but no, he was but a man of letters on his tour, and he was quite satisfied to adopt the prejudiced views of others. Ignorant as he is in matters political, Mr. FROUDE says he could not help asking himself of what use such a possession as Trinidad could be either to England or the English Nation (p. 66). A simple enquiry at the Government Offices would have informed him that, in 1886, the year previous to his visit, of 1,196,076 tons of shipping entered and cleared at the ports of the colony, no less than 774,916 tons were British. Other people are well aware that besides its own value, agricultural and commercial, Trinidad is invaluable on account of its splendid strategical and commercial situation at the very mouth of the Orinoco. In the result, Mr. FROUDE left Trinidad, taking in his pack not only his own prejudices which he had brought with him, but the prejudices of other prejudiced persons as well.

At Barbados, Mr. FROUDE was a guest at Government House, and he does not omit to do justice to the renowned hospitality of Sir CHARLES and Lady LEES. At their numerous dinner-parties he no doubt met many of the leading men of the Island, but his Book offers no evidence that he made any study of the inhabitants or of their institutions. He wrongly describes the constitution of Barbados as consisting of an Assembly of thirty-three members, nine of whom the Crown nomi-

nates, the rest are elected (p. 103), whereas there are separate chambers of the Council and the Assembly. The Assembly, or local House of Commons, was in Session, and Mr. FROUDE did attend one meeting of that body, but he cared for none of those things, and frankly says :—

“ The most interesting part of the thing to me was the “ *hall* in which the proceedings were going on” (p. 111). He spent a day at Farley Hill with the late Sir GRAHAM BRIGGS, whose subsequent death he describes as depriving Barbados of one of the ablest of her legislators, although that gentleman had not for years sat in the Legislature. He found Sir GRAHAM very down upon his luck, and very sore on account of the falling through of a movement in 1885 for a Treaty with the United States, by which the West Indies would have secured a good market for their produce. Of the veto put upon that Treaty by the Imperial Government, Mr. FROUDE says in one place (p. 108), “ The Board of Trade had, no doubt, excellent “ reasons for objecting to an arrangement which would “ have flung our whole commerce with the West Indies “ into American hands, and might have formed a prelude “ to a closer attachment. It would have been a violation “ also of those free-trade principles which are the “ English political gospel.” In another place (pp. 371, 372), our unreliable author thus denounces that same veto : “ *The English Government, on some fine-drawn crotchet, refused to Colonies which were weak and helpless what they would have granted without a word if demanded by Victoria or New South Wales, whose resentment they feared*” ! Those who knew the late Sir GRAHAM BRIGGS will not need to be told that, if he did say anything to justify Mr. FROUDE’S conjecture

that Sir GRAHAM and other West Indians were ready to become American citizens, the deceased gentleman said it in his haste, and when smarting under a sense of wrong. Few, indeed, are those who sincerely desire such annexation, if there be any such. Our hearts, our pride, are in the Old Country. Personally conducted by Colonel ELLIOTT, the Inspector General of Police, Mr. FROUDE drove about the Island, seeing things from the outside, and not going beneath the surface. The Church of St. John and its churchyard seem to have interested him more than the people he saw "thick as rabbits in a "warren" (p. 114). It was so much more easy to gather information at second hand than to go himself in search of facts, that he simply lounged life away in Barbados, "perfectly idle and perfectly happy" (p. 110). Having in this manner 'done' the colony, our worthy Tourist, in hurrying on to Jamaica when returning from Dominica, had no need to land at Bridgetown, so, with a clear conscience he sets down in his Book—"At Barbados there "was nothing more for me to do or see. The English "Mail was on the point of sailing, and I hastened on "board"! "

At Dominica, Mr. FROUDE was the guest of the Administrator of the Government of the Island, Captain SPENCER-CHURCHILL. To his guest, Captain SPENCER-CHURCHILL talked sorrowfully enough of his own situation and the general helplessness of it (p. 147.) Despite, however, our author's aversion for desponding people, he admits that his host made his fortnight's visit a very pleasant one, and that he left "Captain C. with a warm hope "that he might not be consigned forever to a post which "an English gentleman ought not to be condemned to

" occupy; that if matters could not be mended for him
 " where he stood, he might find a situation where his
 " courage and his understanding might be turned to
 " useful purpose." It is a thousand pities that our
 author has not described the various schemes matured
 by his host for the improvement of Dominica, and the
 various large measures of public utility initiated by him,
 " but which have fallen flat, presumably through the pur-
 blind obstruction of that local Council, which Mr.
 FROUDE describes as " contrived to create the largest
 " amount of friction, and to insure the highest amount of
 " unpopularity to the administrator."

With his magical pen, Mr. FROUDE paints in charming style the wonderful beauties of scenery to be found in Dominica. As elsewhere, he saw something of the outside of things. He rambled about Roseau and its neighbourhood, and marooned in the mountains of the Island, but he saw little of the inner life of the Colony, sufficient for his purposes being the one-sided statements of those with whom he consorted. He gets the length of enquiring as to the rate of servants' wages, which he finds surprisingly low. In the market-place of Roseau he even exchanges badinage with some of the women he found there. Our philosopher thus pleasantly records his rencontre with some of the black belles :—

" Two or three of the best looking, seeing that I
 " admired them a little, used their eyes and made some
 " laughing remarks. They spoke in their French *patois*,
 " clipping off the first and last syllables of the words.
 " I but half understood them, and could not return their
 " shots. I can only say that if their habits were as
 " loose as white people say they are, I did not see a

"single licentious expression either in face or manner. "They seemed to me light-hearted, merry, innocent "young women, as free from any thought of evil as the "peasant girls in Brittany." On reading the conclusion come to in the latter part of the foregoing extract, one cannot but deplore that, during his limited visit to the West Indies, Mr. FROUDE consistently refrained from coming into contact with any but the dominant classes in the Colonies. His chaff with the market women is one of the only two or three instances recorded in his book, where he talked with any of the labouring classes, whilst not a single instance can be recalled of any attempt on our author's part to make himself acquainted with those intermediate classes who, *willy nilly*, are the coming people of the West Indies. He was not unaware of their existence, but he studiously ignored it when he might have made acquaintance with it. The main burden of his book is, however, a fulmination against the growing importance of those classes.

The general state of Dominica appeared to our Tourist as one of general dilapidation. Bad as things were they were going to worse, and it was all the fault of the Imperial authorities, who failed to apply the system of Indian Administration to this and the other West Indian Colonies. The local Council, with its Island Hampdens, was to him nothing less than anathema. He says cultivation is annually becoming less, and that this is the result of the present form of Government (p. 143).

But our Tourist, although he might not propose, himself to study what men were doing with the land in Dominica, was not to be let off making some personal observation

of the working bees of the Island. He was to see what could really be done in Dominica by an English gentleman who had gone the right way to work there (p. 164). Dr. ALFORD NICHOLLS, a gentleman who does not trust to the local Council to grow his crops, or to the Colonial Office to give him good prices, sent Mr. FROUDE "an invitation to call on him and see what he was about." It is observable that Mr. FROUDE, who came out to study the condition of men and things in the West Indies, did not seek this opportunity—it was thrust upon him. He says, however, that he was delighted to avail himself of it. He found a small plantation in a high state of cultivation, producing mainly limes and Liberian coffee. Dr. NICHOLLS had every hope of profit from the produce. Mr. FROUDE thus records the experience of Dr. NICHOLLS on the labour question :—

" In apparent contradiction to the general West Indian experience, he told me that he had never found a difficulty about it. He paid them fair wages, and paid them regularly without the overseer's fines and drawbacks. He knew one from the other personally, could call each by his name, remembered where he came from, where he lived, and how, and could joke with him about his wife or mistress. They in consequence clung to him with an innocent affection, stayed with him all the week without asking for holidays, and worked with interest and good-will. Four years only had elapsed since Dr. NICHOLLS commenced his undertakings, and he already saw his way to clearing a thousand pounds a year on that one small patch of acres. I may mention that, being the only man in the island of really superior attainments, he had tried in vain to win one of the seats

"in the elective part of the legislature (p. 165)." Over-anxious to put a sting into the tail of his statement, Mr. FROUDE does not see that he is at the same time reflecting upon the Executive of the Island. Dr. NICHOLLS should have sat in the Council as a Government nominee. It should not have been necessary for him to seek a seat as an elective member. As it was, he failed to secure in the Legislature his election, not because he was a man of superior attainments, but because he was a Government Officer receiving a superior salary. The electors knew what they were about. A Government Officer who serves in a Legislature as an elective member, is expected to vote with the Government. Should he fail to do so, he would promptly be informed that his serving in a Legislative capacity was incompatible with the efficient discharge of his official duties. Should he demur, he would be told that he must resign his appointment if not his seat. This is all right and proper, but, surely, there is no ground for reflection upon the electors of Dominica, because, knowing 'the hang of things,' they should have preferred a representative who was not in the service of the Government. The main fact remains, however, that, notwithstanding all Mr. FROUDE'S jeremiads over the existence of the elective principle in Dominica, an English gentleman who goes the right way to work, can do very well for himself there.

A few pages earlier in his Book, Mr. FROUDE had himself been moralising upon the short-sightedness of young Englishmen who might seek their fortunes in Dominica, but did not do so. He says there —

"Here was all the profusion of nature, lavish beyond all example, and the enterprising youth of England

“ were neglecting a Colony which might yield them
 “ wealth beyond the treasures of the old sugar planters,
 “ going to Florida, to Texas, to South America, taking
 “ their energy and their capital to the land of the
 “ foreigner, leaving Dominica, which might be the gar-
 “ den of the world, a precious emerald set in their own
 “ Antilles, encircled by the sacred memories of glorious
 “ English achievements, as if such a place had no ex-
 “ istence ” (p. 160). Asked now, by Dr. NICHOLLS, why
 young Englishmen went planting in so many other
 countries, “ went even to Ceylon and Borneo, while
 “ comparatively at their own doors, within a fortnight’s
 “ sail of Plymouth, there was this island immeasurably
 “ more fertile than either,” our Sir Oracle thus gravely
 delivers himself :—

“ The explanation, I suppose, is the misgiving that
 “ the West Indies are consigned by the tendencies of
 “ English Policy to the black population, and that a
 “ local government created by representatives of the
 “ negro vote would make a residence there for an ener-
 “ getic and self-respecting European less tolerable than
 “ in any other part of the globe.” (p. 165). Surely, this
 is somewhat hard upon Dr. NICHOLLS. Does Mr. FROUDE
 not consider him an energetic and self-respecting
 European? Dr. NICHOLLS might well have asked Mr.
 FROUDE why Englishmen go to Texas. Florida and
 South America, when they might go to Ceylon, with
 its government modelled on the Indian fashion. The
 negrophobist writings of Mr. FROUDE are hardly likely
 to encourage young Englishmen to try their fortunes in
 Dominica.

Things are not so bad in Dominica, as Mr. FROUDE

allows himself to believe. That colony may be said to have 'turned the corner' towards a brighter state of things. The value of the Exports from the Island in 1886, the year which ended just before Mr. FROUDE'S visit, was substantially greater than in either of the two preceding years. Dr. NICHOLLS is not the only man in the colony who is trying 'mixed cultivation,' and 'minor industries.' Others are doing the same thing, though on a smaller scale. All of these are following in the footsteps of the late Dr. IMRAY, the pioneer of the movement. So far from the English connection with the Island languishing in favour of the French, of the total of 304,423 tons of shipping entered and cleared there in 1886, no less than 302,063 were British. Mr. FROUDE writes that a boatful of soldiers from Martinique could take the Island. He seems to be ignorant of the fact that Martinique itself has often been taken by the English, who might have retained possession of it to this day, but for the fact that in the old days of Protection, and when the West Indian interest was all-powerful, it did not suit English owners of West Indian property to have larger quantities of Sugar brought into their market by the annexation of French Sugar Colonies. As to our Negrophobist's statement that scarcely one of the inhabitants of Dominica, except the officials, would lift a finger to save the connection, that is a mere instance of his Froudacity. "You forget that we beat you at Waterloo"! said an English Black Man to a French Black Man by way of silencing the latter. For one thing, at all events, the inhabitants of Dominica should feel thankful to Mr. FROUDE. In his anxiety that they should be well governed, he recommends the appointment

as their Governor of men of the stamp of the late Rajah BROOKE of Sarawak, and of Mr. SMITH of Scilly. If none such can be secured, then says Mr. FROUDE 'even a SANCHE PANZA would do.' Here he draws the line. At all events he does not propose that SANCHE PANZA'S Master shall govern Dominica. Evidently Mr. FROUDE does not himself contemplate putting into practice the principles of that kind of Government of which he affects to be the High Priest.

Remounting his Rozinante, in the shape of a Royal Mail Steamer, the modern Knight of La Mancha again set out in quest of other wind-mills. Careering across the Caribbean sea, on his way to Jamaica, he was compelled, by the route taken by the Mail Packet, to stop at the Port of Jacmel, in Hayti. How much Mr. FROUDE was able to learn of the true state of things in Hayti, from his hour ashore at Jacmel, it would be difficult to say. His own statement:—"My hour's leave of absence " was expired. I made my way back to the landing-
" place, where the Mail Steamer's boat was waiting
" for me," shows that he landed for an hour only (p. 188). Later on, when returning from Cuba to Jamaica, Mr. FROUDE again set foot upon Haytian soil. This time it was at Port-au-Prince. The Royal Mail Steamer remained in harbour there but a few hours. He landed. His own account of the time he was on shore says:—"I stayed no longer than the ship's business detained the captain, and I breathed more
" freely when I had left that miserable cross-birth of
" ferocity and philanthropic sentiment" (p. 345). Mr. FROUDE had assured Chief Justice REEVES of Barbados that he was going to Hayti to learn what he could, on the

spot. He somewhat modestly observes :—"I could not expect that I, on a flying visit, could see deeper into the truth than Sir SPENCER ST. JOHN had seen, but," he adds, with a fine touch of irony, "at least I should not take with me a mind already made up, and I was not given to credulity" (pp. 127, 128). An hour ashore at Jacmel, and perhaps one or two hours at Port-au-Prince, constituted Mr. FROUDE's mode of going to Hayti to learn what he could on the spot. This is a remarkable travesty of CÆSAR'S *veni, vidi, vici!* but then, Mr. FROUDE is not CÆSAR; he is merely a worshipper of Cæsarism. Would any earnest seeker after truth have thus turned his back, not once, but twice, upon the opportunity for clearing up those doubts as to the dread charges made against the Haytians, which he told Chief Justice REEVES he entertained? Nay, was not the Knight bound, in honour of the lady DULCINEA DEL TOBOSO, to have remained in Hayti, and with his magic pen, so much more powerful than any sword, to have slain, in the sight of all the world, the grim giants who were keeping the beautiful damsel HAYTIA, in the Castle of darkness and in the chains of Vodou? His illustrious prototype, as described in the pages of CERVANTES, would certainly not own him as a true Knight, or *Chevalier sans reproche*.

Of Jamaica, the Queen of the British Antilles, formerly England's most splendid Colony, Mr. FROUDE has nothing fresh to say. He stayed at King's House with Colonel JUSTICE who was then administering the Government of the island, and who, he thinks, had very likely never heard of the great Mr. FROUDE (p. 141), at Miss ROY'S boarding house in Mandeville, and with

the Commandant at Port Royal. On his homeward voyage from Cuba, he again landed at Jamaica, and then was the guest at Cherry Garden of Mr MARESCAUX the local manager of the Colonial Bank. Haunted throughout his trip by the Irish Question, our Tourist indulges in a soliloquy upon Irish affairs, whilst on board the Royal Mail Steamer in Kingston Harbour. Mr. GLADSTONE is to Mr. FROUDE, as King CHARLES'S head was to Mr. DICK. The exuberant imagination of the one cannot tolerate the exuberant verbosity of the other. At last Mr. FROUDE was taken in hand by the then Colonial Secretary of Jamaica, Mr. NOEL WALKER, who was formerly Assistant Government Secretary of British Guiana. Mr. WALKER, now Colonial Secretary of Ceylon, was one of the few persons Mr. FROUDE came across who had a good word to say for the Black People. With his twenty-five years' experience of them, Mr. WALKER'S testimony must have some weight as against the hostile criticisms of Mr. FROUDE'S nameless informants, even though our Tourist, from general conversation gathered that the sanguine views of the Colonial Secretary were not widely shared. (p. 213).

It does not appear from his book, that when, on his tour, Mr. FROUDE visited a single Sugar Estate. He had a soul above such things. In Jamaica, the opportunity for inspecting plantations was given him, but, says he, "I declined to be taken over sugar mills, or to be shown the latest improvements. I was too ignorant to understand in what the improvements consisted, and could take them upon trust. The public bakery was more interesting". It is only from the author's supercilious reference to the "latest improvements", that his readers

can learn that in Jamaica, at all events, Planters are keeping abreast with the times, in the process of manufacture. On the other hand, the refusal to be taken over "Sugar-Mills," is but an illustration of Mr. FROUDE'S want of *savoir faire*, if he really felt a sincere desire to study the condition of men and things in these Colonies. Had he visited a number of the plantations in the Islands he stopped at, he would have learned what men of African and of mixed Races are doing, better than he could "by drives about the town and "neighbourhood." He would have then realised the progress in skilled labour, and in the power of organization, made by members of those races. He would have found plantations, large and small, in the working and management of which not a single white man had part. And, if the faculty to endure hard times without disorder be a test of social advancement, our Tourist might have learned how well the labouring classes have borne the heavy reductions of wages, which the Bounty System has necessitated throughout the West Indian Colonies.* It was not, however, in such folks as these that our author was interested. His sympathies were with the English in the West Indies. After all, however, sugar

* Machinery is cheaper, Freights are lower, and other things have tended towards economy, but the main reduction has been in wages. The following extract from a paragraph in the *European Mail* of the 3rd of May 1888, speaks volumes — "*Needs must when the devil drives.*" *Ten years ago, when the price of cane sugar was about double what it is now, the Colonial Company produced 17,111 hogsheads of sugar at a cost of 22l. 2s. per ton. Last year they produced 25,726 tons at a cost of 10l. 14s. per ton.* True it is, as the deputy chairman, Mr. R. Gillespie, said, "*Adversity sometimes teaches a useful lesson,*" and we are glad to find that *losses* has not been lost on the directors.

still remains the staple of these Colonies, and no one but a mere Bookman would have dreamed of enquiring into the condition of men and things in the West Indies, without making an opportunity for observing life on plantations. Still less should a self-constituted special correspondent of the British Public have "declined to be taken over sugar mills," when the opportunity was made for him. Our Knight Errant was in quest of Wind Mills, not of Sugar Mills.

Mr. FROUDE in his "drives about" observed that on market days the roads in Jamaica were thick with country women, who tramped into Kingston with baskets of fruit and vegetables on their heads. Here and there, astride of a mule or donkey, was a Black Man, pipe in mouth and carrying nothing (pp. 239, 263). It does not seem to have occurred to our author that these men might be riding into town on Estates' business, or on their own; or, that they might have come from greater distances. On the contrary, he jumps to the conclusion that these men were lazy fellows who were taking it easily while the women, poor things, were the beasts of burden, slaving for these very wretches. So far from dreaming that in the thousands he met, the riders were going on quite a different errand to that of the women who went a-foot, he seems to have taken the former as "drivers", or foremen, of the latter, and he sets down that "the road was thronged with women plodding along with their baskets on their heads, a single male on a donkey, to each detachment of them, carrying nothing, like an officer with a company of soldiers" (p. 263). On one market day it so befell that, as our Knight was taking a drive to *Cherry Garden*, he met numbers of these

country women, with their escort of dark cavaliers Remembering his vows and the service sworn to his lady of Toboso, he turned upon his Squire : in this case not SANCHE PANZA, but an African coachman : and rated him roundly upon the shame of " the poor creatures toiling so cruelly, while their lords and masters " amused themselves " (p. 263). The coachman only laughed, and said " Ah, Massa, women do women's " work, men do men's work—all right." To the question put by the Knight, " And what is men's work " ? the coachman made no direct answer, but observed triumphantly, " Look at the women, massa—how they laugh— " how happy they be ! Nobody more happy than black " woman, massa." During this tilt at a windmill the Knight had so badgered his poor Squire, that the latter lost his way, with the result that the household at *Cherry Garden* was alarmed for the safety of their expected guest, until he arrived late and weary. Excepting this unfortunate coachman, no other man of African or of mixed race, appears to have had the honour of conversing with Mr. FROUDE, in Jamaica, save only Mr. MARESCAUX'S butler. So much, therefore, for our Tourist's study of the great bulk of the human beings in Jamaica.

As Mr. FROUDE would have Englishmen believe that the West Indies, generally, are in a very bad way indeed, it is pleasant to find that one who was really in a position to judge what was the financial position of Jamaica, could speak hopefully of business prospects. Mr. FROUDE visited the West Indies at a time when those involved in the sugar industry were reeling under the swashing blow which the Bounty System had struck them. This notwithstanding, Mr. MARESCAUX, the

Manager of the Colonial Bank in Kingston is described, as giving him the following cheery account of things:—

“ No one understood better than Mr. M——— the troubles and dangers of the Colony, but he was inclined, perhaps by temperament, perhaps by knowledge, to take a cheerful view of things. For the present at least he did not think that there was anything serious to be feared. The finances, of which he had the best means of judging, were in tolerable condition. The debt was considerable, but more than half of it was represented by a Railway. If sugar was languishing, the fruit trade with the United States was growing with the liveliest rapidity. Planters and merchants were not making fortunes, but business went on.” (pp. 267, 268.)

Such was the state of things in Jamaica, at a time when its most important industry had well nigh suffered from a catastrophe. Surely, the outlook was rather a hopeful one. And yet, according to Mr. FROUDE, the colony's future was imperilled by the privilege the Taxpayers enjoyed of electing a certain number of the Members of the Legislature of the Island. (pp. 354, 355.)

It cannot but be regretted that Mr. FROUDE should have seen so little of the soldier-statesman who has for the last four years and a half so ably and so happily filled the office of Governor of Jamaica. When Mr. FROUDE made his first stay in the Island, Sir HENRY NORMAN was away in England, whither he had been summoned on public business of an exceptional nature. Of him, when absent, our author writes thus:—“ The Governor, Sir HENRY NORMAN, of Indian fame, I was sorry to learn was still absent; he had gone home on some legal business. Sir HENRY had an Imperial

“reputation. He had been spoken of to me in Barbados
“as able, if he were allowed a chance, to act as Viceroy
“of all the islands, and to set them on their feet again.
“I could well believe that a man of less than Sir HENRY’S
“reputed power could do it—for in the thing itself there
“was no great difficulty—if only we at home were once
“disenchanted, though all the ability in the world would
“be thrown away as long as the enchantment continued.”
(pp. 180, 181.) As it came about, Mr. FROUDE did,
on his second stay at Jamaica, make the personal
acquaintance of Sir HENRY NORMAN. Again, our
author writes in terms of hopeful anticipation —“Sir
“HENRY NORMAN had been one of the most eminent of
“the soldier civilians in India. He had brought with him
“a brilliant reputation ; he had won the confidence of all
“classes and all colours. He, if any one, would under-
“stand the problem, and from the high vantage ground
“of experience would know what could or could not be
“done to restore the influence of England and the
“prosperity of the colonies. Unfortunately, Sir HENRY
“had been called to London, as I mentioned before, on
“a question of the conduct of some official, and I was
“afraid that I should miss him altogether. He returned,
“however, the day before I was to sail. He was kind
“enough to ask me to spend an evening with him, and
“I was again on my last night, a guest at King’s House.”
(p. 353). Was Mr. FROUDE disappointed in his expectations
of Sir HENRY NORMAN? Let him speak for
himself, with that modesty which so eminently distinguishes
him.—“A dinner party offers small opportunity
“for serious conversation, nor, indeed, could I expect a
“great person in Sir HENRY’S position to enter upon

“ subjects of consequence with a stranger like myself.
“ I could see, however, that I had nothing to correct in
“ the impression of his character which his reputation
“ had led me to form about him, and I wished more than
“ ever that the system of government of which he had been
“ so admirable a servant in India could be applied to his
“ present position, and that he, or such as he, could
“ have the administration of it.” The Man of Letters
and the Governor then spoke of mutual friends. The
Governor spoke of REYNELL TAYLOR as the ‘very soul
of chivalry’: whereupon Mr. FROUDE observes of Sir
HENRY NORMAN that he “seemed himself to be a man
“ of the same pure and noble nature, perhaps liable,
“ from the generosity of his temperament, to believe
“ more than I could do in modern notions and in modern
“ political heroes, but certainly not inclining of his own
“ will to recommend any rash innovations” (p. 353). It
is noteworthy that Mr. FROUDE “had nothing to correct”
in the impression of Sir HENRY NORMAN’S character,
which the Governor’s reputation had led Mr. FROUDE to
form about His Excellency. It is also noteworthy that Mr.
FROUDE formed the opinion, after meeting Sir HENRY
NORMAN, that the latter was certainly not a man “in-
“ clining of his own will to recommend any rash innova-
“ tions.” There was further talk between the Governor
of Jamaica and his guest, the gist of which is thus set
down by the latter :—“ I perceived that like myself he
“ felt no regret that so much of the soil of Jamaica was
“ passing to peasant black proprietors. He thought
“ well of their natural disposition; he believed them
“ capable of improvement. He thought that the pos-
“ session of land of their own would bring them into

'voluntary industry, and lead them gradually to the adoption of civilised habits. He spoke with reserve, and perhaps I may not have understood him fully, but he did not seem to me to think much of their political capacity' (p. 354). Our Tourist then tried to pump Sir HENRY for his opinion upon the Local Boards, but Sir HENRY was not to be pumped. Mr FROUDE had himself heard a very bad character of these Boards. Although his few days' visit had been spent in Kingston and its neighbourhood, and at the boarding-house in Mandeville, he makes the thoroughly Froudacious statement that "in all parts of the island" the Local Boards had been described to him as "inflamed centres of peculation and mismanagement." He inferred, that Sir HENRY NORMAN had no great belief in a federation of the islands, in responsible government and 'such like,' as within the bounds of present possibilities. Nor, did Sir HENRY "think that responsible statesmen at home had any such arrangement in view" (p. 354). Much as he admired Sir HENRY NORMAN, Mr. FROUDE appears to have detected a something unorthodox about the Governor's views upon political questions. The fact was, Mr. FROUDE knew from a sure hand that it had been in contemplation, a few years ago, to give the West Indies what is known as responsible Government, and so he tells his readers what he did not like to break to Sir HENRY NORMAN. His invectives against such an arrangement, extend to Ireland, Hayti, and Mr. GLADSTONE. There must, indeed, have been a smell of sulphur at King's House, as Mr. FROUDE explains, "I could not say what I felt completely to Sir HENRY, who, perhaps had been in personal relations with

" Mr. GLADSTONE'S Government" (p. 355). For the sake of the West Indies one cannot but wish that Mr. FROUDE had seen more of the capable man who rules Jamaica, but, for Sir HENRY NORMAN'S own sake his conversation with his literary guest appears to have been all too long. It is understood that Sir HENRY'S observations upon the New Guinea question have not been correctly represented by Mr. FROUDE. (pp. 355, 356.)

West Indian newspapers have dealt with Mr. FROUDE'S several inaccuracies in the manner these deserve. There is no need to refer in detail to the good work done by those journals. One incident described by Mr. FROUDE has, however, been explained by *The St. George's Chronicle* of Grenada, in such a manner as illustrates well the Froudian system of making up facts as the Tourist goes on his way. Voyaging, to Trinidad, from Barbados, the Royal Mail Steamers touch on their route at St. Vincent and Grenada. When Mr. FROUDE himself was a passenger from Barbados for Trinidad, Mr. SENDALL, the Governor-in-Chief of the Windward Islands, came on board at St. Vincent, an Island where there are not more than two hundred whites, although Mr. FROUDE says there are two thousand. (p. 45). When His Excellency reached Grenada, where he was to disembark, the government barge came off to the Mail Steamer for him. The Harbour Master, whose duty it is to board every ship arriving at the Port, also came off in his boat to the Mail. Now, it so happened that, at the time of Mr. FROUDE'S tour, the Office of Harbour Master was held by a man of such solemn aspect that his friends nicknamed him *The Reverend*. No doubt, Mr. FROUDE overheard some familiars addressing

the Harbour Master as *Reverend*: whilst he beheld the Governor's barge flying two flags, when *The Reverend's* bore but one. The true genius knows what is what by inspiration. No enquiry was needed. Mr. FROUDE took in the true state of things at a glance. So he writes down in his book "Mr. S——landed in an "official boat, with two flags, to distinguish it from a "missionary's boat, which had only one"! (p. 53) While Mr. FROUDE was inventing his facts, he might have given a less puerile reason than he has offered for a Governor's barge bearing two flags. He might, too, have described the Harbour Master as a clergyman, or a minister, instead of as a Missionary, had it not been that, Grenada being in his eyes an embryo Hayti, he could not then have made the point that he was at the time, indeed, *in partibus*. No other *modus operandi* than that of inventing his facts, was open to a Tourist who, in a few weeks, was by "drives about the town and neighbourhood," to see the human inhabitants, and "learn what they were doing, how they were living, and what they were thinking about" (p. 73).

Readers of his book cannot fail to observe that Mr. FROUDE is a superior person. Indeed, he is a most superior person. The Captain of the Royal Mail Steamer in which our Tourist travelled from Barbados to Jamaica had but one eye, but even that single eye "was quick to "see if there was any personal merit in a man, and if "you deserved his respect you would have it" (p. 79). But, superior persons have a way of lumping together, without any distinction, all people who happen not to move in their own charmed circle. So it is with our Tourist. Consorting with the Government House set wherever he

went, he takes no cognizance of the intermediate classes between the dominant party and the black peasant proprietors. There are, nevertheless, many persons who have not the *entrée* to Government House, and whom Mr. FROUDE would not meet among the select of society, who might yet be thought worthy of being permitted to live. Some of these are whites, some are persons of mixed race, others are Africans pure and simple. It does not, however, suit Mr. FROUDE'S book to make any distinctions. With him, the question of allowing the Taxpayers to elect some of the Members of Council is a question between the white planters ' and their emancipated slaves ' (p. 351). Thus it comes about that, save some disparaging allusions (pp. 88, 97, 155, 211), Mr. FROUDE does not seem to recognise that the people of mixed race form an important factor in the life of the West Indian Colonies. He learns at Jamaica, apparently for the first time, that some of these people are somebodies. They had even been seen at Government House. " There were mulattoes," he says, " in the island, of wealth and consequence, " and at Government House there are no distinctions ; " but the English residents of pure colonial blood would " not associate with them, social exclusiveness increasing " with political equality. The blacks disliked the mulattoes ; the mulattoes despised the blacks, and would not " intermarry with them. The impression was that the " mulatto would die out, that the tendency of the whites " and blacks was to a constantly sharpening separation, " and that if things went on as they were going for " another generation, it was easy to be seen which " of the two colours would then be in the ascendant.

"The blacks were growing saucy, too, with much else of the same kind. I could but listen and wait to judge for myself" (pp. 213, 214). As to judging for himself, our Tourist took no steps to get evidence. Gossip was sufficient for him. Had Mr. FROUDE visited the West Indies as an ordinary Tourist, he might have been as socially exclusive as he chose. Coming as he did, as a self-appointed special Reporter to the British Public he ought not to have turned his back upon the opportunities which presented themselves to him at King's House. The future of the West Indies belongs to the Mixed Race. So far from the mulattoes dying out, they number one to every four Africans in Jamaica. But, it is not in Jamaica only that there are mulattoes of wealth and consequence. The same is the case in all the West Indian Colonies. In Barbados, they have a cultivated Society of their own, but, of course, our Tourist, although bent upon carrying out his self-imposed task of letting the British Public know the real condition of men and things in the West Indies, did not think information about them worth the seeking. At Barbados, it is true, Mr. FROUDE did make the acquaintance, at a dinner party, of one man of mixed race, in the person of the Chief Justice of the Colony, whom he describes as "a negro of pure blood," although Mr. REEVES has an admixture of white blood in him (p. 124). Mr. FROUDE, of course, looks upon Mr. REEVES as a 'phenomenon': and well he might, having regard to the intense prejudice which has in past times prevailed among the whites of the old colony of Barbados. Our Tourist writes of Mr. REEVES as having risen to his high position as a lawyer only, and, regarding him only as 'an

African of pure blood,' reflects as to the Chief Justice's chances, had he been a citizen of Hayti or Dahomey. It would hardly suit Mr. FROUDE's book to recognise that Mr. REEVES had risen to eminence as a politician rather than as a lawyer. In such a case, there would be the inconvenient admission of political capacity in the people of colour. What are the facts, however? Some years ago some political pick-pockets attempted to steal from the Barbadians their old, and cherished constitution. The whites, and the coloured people, strenuously resisted. Mr. REEVES, then Solicitor General, resigned his office, joined the opposition and became its leader. The Islanders gained the day. In gratitude to Mr. REEVES, they made him a handsome present, and, not thinking that sufficient, they wanted him to be their Chief Justice, when this appointment became vacant. Desiring to gratify the Colonists, the Secretary of State of the day appointed Mr. REEVES to be Chief Justice of Barbados. It is not in Mr. REEVES that Mr. FROUDE has found a phenomenon. It was the conduct of the whites of Barbados that was phenomenal. The fact is that, able lawyer as Mr. REEVES undoubtedly is, he had not been Chief Justice of his Colony to-day but for the political crisis of 1876, on the top of which he rose, and has since further risen in the esteem of his fellow-colonists. But, here again, Mr. REEVES was only a representative man, and not a phenomenon. The coloured people of Barbados, of intelligence and of property, were, almost to a man, on the same side as the whites in 1876. Mr. REEVES would himself be but a mean-spirited churl if he did not recognise and assert that there were many other able and honourable men of colour in the West Indies. His own

public acts show that he has confidence in his fellows. Although he had already become Chief Justice of Barbados when the present *Franchise Act* came into force, the movement in favour of the extension of the Franchise may safely be said to have been initiated by Mr. REEVES. By the operation of the new Law the electorate has been increased from 1631 to 4,200 voters. Even this mild measure of reform, is one at which Mr FROUDE sapiently shakes his head. Ignorant as he is of all that relates to the welfare of the West Indies, he does not know that Legislation for Barbados is initiated in the Legislature of Barbados. By the exercise of his imagination, he explains the extension of the Franchise, *more suo*:—"By an ordinance from home the suffrage has been widely extended, obviously as a step to larger intended changes" (pp. 103, 104). Not even are Crown Colonies governed by "Ordinances from home." How much less, then, a Colony like Barbados, which enjoys Representative Government! Having once invented his facts, our Tourist cannot help running riot with his error. In this manner, when he finds the Governor of Barbados anxious, over-anxious he thinks, owing to the hard times Barbados was passing through in the early part of 1887, Mr. FROUDE thus sententiously delivers himself: "The Government at home, no doubt with the best intentions, has aggravated any peril which there may be by enlarging the suffrage" (p. 104).

Our author's attitude towards the Imperial Government is at all times that of a tiresome scold. In the matter of the extension of the Franchise in Barbados,

the authorities of Downing Street had wisely allowed the people of Barbados to reform their own electorate. The nominated members of the Council of Jamaica, under Crown Government, having resigned their seats in a body, and the colonists having been nauseated with that well-meaning form of despotism, something had to be done to mend matters. The inhabitants of Jamaica petitioned the Imperial Government for some measure of Representative Government. Lord DERBY, who was at the time Secretary for the Colonies, wisely decided to accede to their wishes. In consultation with Sir HENRY NORMAN, Lord DERBY, who cannot be charged with any want of John Bullism, procured for the Islanders their present modified form of Representative Government. It takes time for colonists, whether white, coloured, or black, to become familiar in handling the ropes of a form of Government under which they have not been bred or brought up. Considering all things, the change has been for the people of Jamaica at least a happy one. Certainly, they would not, of their own free will, return to the previous blighting system. To Mr. FROUDE, however, it is all a mistake. Stone-blind as he is to political progress in all forms, nay Gladstone-blind, he detects in this gracious act on the part of the Imperial Government, the horns and hoofs of the Evil One. This is what he says of the introduction of the new form of constitution :—" In 1884 Mr. GLADSTONE'S Government, " for reasons which I have not been able to ascertain, " revived suddenly the representative system ; con- " structed a Council composed equally of nominated and of " elective members, and placed the franchise so low as to " include practically every negro peasant who possessed a

"hut and a garden" (p. 202). The tail of this statement is another instance of Froudacity. The Franchise was not thus fixed by the Home Government. A local Commission was appointed to enquire into the matter of Franchise. Upon its Report the Franchise was founded. In 1886 a *Franchise Enlargement Act* was passed by the Council of Jamaica, with the entire approval of the Governor, Sir HENRY NORMAN. This new Franchise was the one in operation throughout Jamaica, when Mr. FROUDE looked in at that colony.

Whilst Mr. FROUDE fears the African as a political factor, it cannot be said that he hates his black brethren. He seems, indeed, capable of entertaining for the Africans, the feeling he says the slave-owner of old had for them, as if the latter were cattle (p. 247), or horses or dogs (p. 106). He gets the length even of describing them as "children, and not yet disobedient children" (p. 235). But, as already shown, it is not from personal acquaintance with them that he speaks of them. It was evolved from his inner consciousness, or told him by nameless slanderers, that they were tending towards *Haytia*. What is the fact? In a precarious sort of way the superstition of Obeah does still exist in some of the West Indian Islands. How could it be otherwise? It is but eighty two years since Englishmen ceased to take part in the Slave Trade. Up to 1806 thousands of slaves were brought year by year to the Islands from Africa where, according to Mr. FROUDE, they were being spoiled by too much freedom (p. 125). These people were all steeped in the superstitions of the Dark Continent. Again, it is but fifty years since Slavery was abolished in

the Islands. and, whilst it existed, there was little done to Christianise the people. What has been done is the outcome mainly of but fifty years: a mere drop in the Stream of Time. Moreover, long after Englishmen ceased to indulge in the Slave Trade, other Nations were engaged in carrying it on. English influence long failed to convert the latter. CANNING'S eloquent appeal to the Bishop of Hermopolis for a Papal Bull against the Trade, winding up with the reproach that the shameful Traffic was continued by Catholic countries only, merely drew forth the laconic reply *Apparement ils en ont plus de besoin !* It was but in 1867, only twenty-one years ago, that the Slave Trade to Cuba was discontinued. Meanwhile, English Ships of War often captured Slave Ships, and the people taken in these vessels had to be disposed of. In this manner it was that, until some five and twenty years ago, or during the thirty years succeeding the Emancipation, some thousands of *Liberated* Africans were distributed among the British West Indian Colonies, where they served a short apprenticeship. Many of these people are now living. Indeed, only about twenty-five years have passed since a merchant ship called the *Barbara Campbell* conveyed allotments of *Liberated* Africans to Grenada and St. Vincent, from St. Helena, whither they had been taken by an English cruiser. The condition of Heathen blindness in which these captured Africans were brought to the West Indies need not be dwelt upon. Excepting the cannibalistic propensity attributed in the third line of the following verse, PRAED'S description of the worship of the Sandwich Islanders would depict the superstitions of the new comers from the Dark Continent:

*They served the usual logs and stones
With all the usual rites and terrors,
And swallowed all their fathers' bones,
And swallowed all their fathers' errors.*

All things considered, now, is it not matter for wonderment that the cult of Obeah is not more in vogue than is actually the case? As ARTEMUS WARD observed, "there is a good deal of human nature in the Black Man." The African, like the European, cannot all at once divest himself of the degraded form of Religion in which he and his fathers were brought up: hence those who live in the West Indies cannot but be struck with the marvellous progress made by the Black Man towards a more civilised view of Religion. So far from relapsing into Obeah, the majority of West Indian Africans have emerged from that form of Religious Bondage, and the remainder will do so in due time. Now and again an idle rogue tries to make a living out of the credulous by setting himself up as an Obeah man. If he bring himself within the clutches of the Law, he should be dealt with as a common rogue. A much more powerful Medicine Man now roams at large. This is the Schoolmaster. Working hand in hand with him are the Ministers of Religion: Anglicans, Roman Catholics, and Wesleyans and others, who exercise their beneficent influence to a much greater extent than Mr. FROUDE wots of. Then, there is the good example of the resident Whites, to whose high tone of life our Tourist can bear testimony. Altogether, the outlook is, surely, not a hopeless one: and especially when it is borne in mind that, in the latter part of the Nineteenth Century more progress in civilization is made in the West Indies in a few years, than used to be accom-

plished by Europeans in whole centuries before the Reformation.

And what is the outcome of Mr. FROUDE's seven weeks' pic-nic in the British West Indies? This: that, after taking "drives about" during his tour, and spending some time in gossiping with persons whom he does not name, but who were evidently men of but limited views and strong prejudices, he writes a book intended to create a sensation.* In his book, he describes the condition of things West Indian from the point of view of a despondent person. Yet, notwithstanding that the value of their great staple has of recent years been painfully low, never were the Islands more productive. There has been a shrinkage in value, but an increase in quantity of sugar and other products. So far, too, from the English interest in the islands suffering, where the negro is prosperous, as in Grenada, it is a fact that English merchants doing business with that Island clear more profit from their commissions now, than they got when they owned and worked Sugar Estates there for some years previously. So ignorant is Mr. FROUDE of what is going on in the West Indies, that he says the Whites will not intermarry with their fellow-colonists of Mixed Race. As a fact, such intermarriages are in-

* In his bright little book *The Chinese painted by Themselves*, Colonel TCHENG-KI-TONG fitly describes the manner of writing a modern Book of Travels. He says (p. 3):—

The fact is, that the book is often written before the travels are undertaken, for the simple reason that the aim of the journey is the book to be published. The object is to obtain three hundred pages of print; what does it matter about the truth? On the contrary, if the book is to sell, it must be spiced with the singular, the horrible, social evils, scandals, or disgusting details.

creasingly numerous in the West Indies. Colour prejudice is still strong, but it is not so strong as it has been. The antipathy of the old set for 'new people,' which exists all the world over, forms an element of this prejudice. In spite of Mr. FROUDE'S championship of the prejudices of his own particular set, he will not succeed in setting the white and coloured colonists by the ears. With bat-like instinct our Tourist delights himself by dwelling upon the dark side of things, and shuns the brighter aspect. The nostrum he prescribes for the ailments he supposes, is the adoption of the Indian system of administration. This is to operate as a sort of political Holloway's Pills and Ointment combined. Failing its adoption : and it has already been tried, is now in existence in some Islands, and has been found wanting : *Tendimus in Haytiam !*

It is clear as the day that Mr. FROUDE brought out his dread of *Haytia*, ready made, with him from England. He might have visited Hayti for but a fortnight, on either of two occasions. It did not suit his purpose to do so. At the same time, he seems to have accepted as evidence against the Haytians, yarns told him by sailors : tales they had heard from others, who had, in turn, been told by somebody else. His knowledge of the Black Man is throughout, akin to the linguistic attainments of the Irishman, who, being asked whether he spoke German, said, no, he did not, but he had a cousin who played the German flute. Knowing nothing of the West Indian man of colour, of either the mulatto or the negro, our Tourist fears that, if these be allowed to vote for some of the members of the Colonial Councils, the end will be *Haytia*, or a relapse

into barbarism. Now, although it cannot be admitted that Hayti is as bad as Mr. FROUDE believes it to be, yet, supposing that it were, where is the analogy between the circumstances of the Haytians and the surroundings of the British Africans? The Republic of Hayti was founded, for the most part, by revolted slaves, many of them pure barbarians, brought from Africa. These slaves had not been successful against their French Masters until they were joined by the free mulattoes of wealth and consequence. The latter threw in their lot with the slaves, only when the French authorities of Hayti persistently withheld from them their civil rights, despite the orders from the Government of France that those rights were to be conceded. Had Mr. REEVES and his coloured confreres in like manner gone against the whites in Barbados, the issue of that crisis might have been somewhat different, so far as the question of retaining the Island's old constitution went. The bulk of the people of the infantile Republic of Hayti were revolted slaves of unmixed barbarism. Their descendants cannot be said to have relapsed into barbarism, as the multitude had not risen from the condition in which the French left them. During the past 95 years, the majority of these people have not enjoyed the leavening power of European influence. There is a class of educated persons among them, for the most part mulattoes, many of whom have been educated in France, but these are swamped by universal suffrage. Such men, if Mr. FROUDE would condescend to converse with them, would tell him how they lament the backwardness of their country, its want of schools, its want of roads. Nevertheless, they have hope of better times.

On the other hand, during the past 95 years, the Africans in the British West Indies have remained under English influence and control. So far from those of to-day being "emancipated slaves," as Mr. FROUDE calls them (p. 351), the majority of them were born free, and the second and third generations of freemen are now growing up. So far from acquiring the land they possess in the violent manner used by the Haytians, the British African has paid for his provision grounds, his cocoa walks, and for his plantations. One would infer, from Mr. FROUDE's statement: "In the Antilles, the plantations broke up "as I had seen in Grenada. The whites went away, "and the land was divided among the negroes" (p. 106), that the Africans had quietly taken over the abandoned lands, and squatted upon them. The truth is, however, that they paid a high price for their land in Grenada, where agricultural land is worth many times as much per acre as its value in England. Land in that fertile island continues to rise in value. It is difficult to say what land in bearing Cocoa is not worth. As to ordinary land, there is the recent instance of a small property called *Mount Gay*, in the parish of St. George. It comprises about 160 acres. A month or two ago £2,000 were offered for the property, and refused, although about eighteen months before only £800 had been paid for it. The industry of the Black man has thus raised the value of land in Grenada. Mr. FROUDE says that the English are clearing out of Grenada at their best speed (p. 55). He has been misinformed. There are more whites in that island now than there were twenty years ago. Many whites would be glad to own property there if they could get it on their own terms. Since the Emancipa-

tion the Island has never been as really prosperous as it is now. As the whole Island gets under cultivation there will be more chance of having white settlers in the higher hill-lands. Again, the School-master has been very active throughout the West Indies for many years past, and the majority of the younger people have come under the influence of education. Whatever it may not have done for them, education has taught the West Indian African to think. The West Indian African who has learned to read, is at the present time thinking how cruelly Mr. FROUDE has misrepresented him. Moreover, English rule is as powerful now as it has ever been, and there is no intention of withdrawing its beneficent influence from the West Indies. Whatever he may think of the Black Man, Mr. FROUDE cannot but admit that the West Indian African does not prove himself un-English by his desire to have some say in the election of those who are empowered to raise and spend his Taxes and to make Laws for him. Those of mixed race and many Whites,—Englishmen still, though not living in England,—are of the same way of thinking. Those Whites who dissent already enjoy as Government nominees, or through Government nominees with an identity of interests, the privilege they would deny to their fellow colonists. They evidently appreciate the luxury of being able to spend other people's money. A Legislature representing but one class can perfect the system of taxing the people of a place, rather than the property of a place, so as to make it rank as one of the fine arts. *Au reste*, no one wants Universal Suffrage, Responsible Government, or any extreme measure. Representative Government must

grow, and the Crown must continue to hold the controlling power.

Searching enquiry will satisfy any unbiassed person that the Africans in the British West Indies are rising in civilisation, rather than relapsing into pristine barbarism. The forthcoming Jubilee celebrations, throughout the British West Indies, promise of themselves to be a refutation of Mr. FROUDE'S cynical attempt still further to blacken the Black Man. The promoters of the Jubilee celebrations have already evinced an amount of self-respect upon the question, of commemorating the Emancipation, that is really remarkable.

Imperial Statesmen should pay no heed to Mr. FROUDE'S vaticinations, founded upon the gossip he heard during his seven weeks pic-nic in the West Indies. He has constituted himself the Champion of the fossil prejudices of a narrow-minded set. He is neither inspired, nor the Heaven-born Minister of State he thinks himself. He is a mere man of the study, who writes with a charming style. Let him stick to his last. He would pass himself off as the Ulysses of the Empire : stripped of his mask, he is discovered to be but the Don Quixote of Colonial and Imperial Politics.

It is fortunate for the West Indies that against the forebodings of a despondent theorist like Mr. FROUDE, the views of a really distinguished man, can be opposed, upon the question of giving the inhabitants, Whites and Coloured, as well as Blacks, some say in the choosing of their Law-Makers. It would be unfair, however, alike to Sir HENRY NORMAN and to our readers, if Mr. FROUDE'S assertion of Sir HENRY'S eminence were to be accepted without some proof, for, with our Tourist, mere geese are swans.

The following simple statement of the services of the present Governor of Jamaica is printed in the *Colonial Office List* :—

NORMAN, GENERAL SIR HENRY WYLIE, C.B. (1859), K.C.B. (1873), G.C.B. (1887), G.C.M.G (1887), C.I.E. (1878).—*Joined the Bengal Army in 1844; served as adjutant to the 31st native infantry throughout the Punjab campaign in 1848-49, including the passage of the Chenab, action of Sordoolapore, battles of Chilianwalla and Goojerat and pursuit of the Sikhs and Afghans; as brigade major or assistant adjutant-general, engaged in numerous affairs and expeditions on the Peshawur frontier in the years 1850-51-52-53-54; in 1855 in the Sonthal campaign in command of a detachment; in the mutiny campaigns of 1857-58-59, as assistant adjutant-general or deputy adjutant-general, and the greater part of the time as adjutant-general to the army in the field; served throughout the siege of Delhi; in all the actions under Great-hed and Grant from Delhi to Lucknow; relief of Lucknow (horse shot under him); operations at Cawnpore; action at Khodagunge, and re-occupation of Futtehghur; siege and capture of Lucknow, March, 1858; campaign in Rohilkund (wounded at the action of Bareilly); campaign in Oude, cold season of 1858-59, including several actions; in 1860 appointed assistant military secretary at the Horse Guards; in 1862, military secretary to the Government of India; in 1870, member of the viceroy's council, and in 1878 member of the Council of India in London; in 1883, appointed governor of Jamaica; was aide-de-camp to the Queen from 1863 to 1869.*

Such is the man against whose judgment the Great Mr. WORDY of our day would set his own preconceived notions.

Bare as is the foregoing record, it forms of itself an Index to many of the most brilliant chapters of England's connection with India during the last forty years. Mr. FROUDE admires men of action. He cannot but admit that Sir HENRY NORMAN is a man of action. Again, it

will be observed that, before Sir HENRY enlarged his reputation as a Statesman, by his most successful administration of the Government of Jamaica, he had already held high place in the councils of the Indian Empire. It was in fact, while serving as a Member of the Council of the Secretary of State for India that he was asked to undertake the Government of Jamaica. So highly was Sir HENRY NORMAN esteemed by his confreres of that illustrious Council, that Sir ROBERT MONTGOMERY, himself a man of high distinction, in complimenting Sir HENRY on behalf of the Board, upon his nomination to the Government of Jamaica, said, that the first question which had arisen in his and his colleagues' minds, when they heard they were to lose Sir HENRY, was, *What shall we do without Norman?*—And what does this experienced man of affairs, who, as soldier and Statesman, has fought and thought to maintain the Empire, and to build it up, think upon the question of Representative Government, in a modified form, of which Mr. FROUDE is so afraid? Sir HENRY NORMAN shall speak for himself. When about to leave Jamaica for a short time, the Governor was, on the 4th December, 1885, addressed in Council in very hearty terms of leave-taking. His Excellency began his reply with these words:—

Gentlemen:—It has given me great gratification to have had a share in the formation of this Council, and to have watched its progress up to the present time, a progress which, though I believe changes may take place, and reforms and additions be made, I still believe has been a marked success.

It was in the following year, that the *Franchise Enlarge-*

ment Law of 1886, was passed, with the approval of the Governor. Again, in May 1888, on proroguing the Council, Sir HENRY NORMAN thus expressed his appreciation of the services of its members :—

Honorable Gentlemen :—As the Council will be prorogued from this date I desire to say a few words before we separate and to thank you for your labours which have been steadily pursued in the midst of some difficulties. I think there was some inclination at one period of this Session on the part of one or two Honorable Members to depreciate the efficiency of the Council. I do not share this feeling. During the eight half-yearly meetings of this Council much good work has been done and I do not hesitate to say that the members deserve the thanks of the community for the energy, patience and ability with which they have performed their duty as representatives elected by the people of Jamaica. I am well aware at what a sacrifice of their private interests and of their convenience some honorable members attend this Council and on all of you the work of the Council imposes a considerable burden. You have always shewn a keen desire for the welfare of the Island, and while maintaining an entire independence have been moderate and always willing to listen to reasons brought forward on either side of a question.

* * * * *

I think nothing has taken place to warrant discouragement at the Constitution or at the action of this Council, and personally I am glad of the opportunity to say how indebted I am to every member for the consideration that is always shown to the views of the

Government—even when they are not accepted—and for the kindly feeling that I have always received from the members individually and collectively.

Long may Britannia's Sceptre rule the Western Main. Long may the enlightened and beneficent guidance of British Statesmen direct the Policy of West Indian Administration. The English African cannot but be the gainer by the continuance of English authority. Perchance, however, in ages now far off, the connection between Great Britain and her West Indian Possessions may be dissolved. Whenever the links may become loosened, let it be the glory of Englishmen to leave to the Islanders not only the English Language, and the memory of the Great Deeds of English soldiers and English sailors with which these Islands are enshrined, but also, the English respect for law-abiding and orderly Government, the English love of Political Liberty and of Liberal Institutions, and the English Spirit of Freedom with Order. Meanwhile, there is need for a prolonged Apprenticeship to the business of Representative Government.



On Gypsum as a Cane Fertiliser.

By E. E H Francis.

GYPSUM is a white crystalline mineral consisting of calcium sulphate (or sulphate of lime) combined with about one-fourth of its weight of water. The latter is not present as ordinary moisture, but as an integral part of the mineral, forming what is known as water of crystallisation. One hundred parts of gypsum contain .—

Calcium oxide (lime)	32.56	} or 79.07 o/o of calcium sulphate.
Sulphuric anhydride	...	.	46.51
Water	...	...	20.93

Several forms of hydrated calcium sulphate or gypsum exist, and are given different names by mineralogists. The boldly crystalline transparent kind is called *selenite*; the compact finely grained variety, *alabaster*; the fibrous, *satin spar*; whilst, *schaumkalk* is in small scales with a pearly lustre. Calcium sulphate also occurs free from water, and is then called *anhydrite*.

Gypsum is very extensively and abundantly distributed, and is not confined to any particular geological formation. In England, its chief source is from the new red sandstone—the mineral quarried from that formation in Derbyshire, Yorkshire and Nottinghamshire, being especially famed—but it also abounds in the London clay. Crystals of selenite are often found distributed through the clay, as at Alston in Cumberland, and Shotover Hill, Oxfordshire, and they can be split into thin plates, sometimes of great size, it is said, even five feet long.

Such plates of selenite were used by the ancient Romans like window glass, for glazing beehives and conservatories, and the mineral was called by them *lapis specularis*. Gypsum exists largely in many other parts of Europe, the deposits in the tertiary strata of Montmartre, near Paris, being of historical interest. Extensive beds occur in several States of North America, especially in New York, Ohio, Illinois, Tennessee and Arkansas, being usually associated with brine springs and salt deposits. Trinidad, and probably other West Indian islands, possess large stores of gypsum.

Compact gypsum, or alabaster, is used like marble for making ornamental articles,—statuettes, vases, &c. It is comparatively soft, and can be easily worked, but is not readily reducible to powder. By being gently heated, however, it readily parts with its water of crystallisation, and then offers little resistance to grinding. If the dehydration is effected at a temperature between 100° and 300° C., the powdered mineral forms the well known “plaster of Paris,” which is remarkable for its property of becoming solid, or “setting,” in a few minutes after being mixed with water to a thin paste. The setting takes place in consequence of a chemical re-union of the powder with the water to form gypsum. Anhydrite, like plaster of Paris, gradually absorbs water and becomes gypsum, but not sufficiently fast to be used in place of it.

Although the virtues of gypsum as a manure were known, to some extent in the early ages, yet it gained no particular prominence as a fertiliser until the middle of the eighteenth century, when MEYER, a German parson, finding it in use in Hanover, studied its effects, and by

his example and writings brought it into general notice. Experimental trials of it were soon being made in all directions. TSCHIFFELI in Switzerland, SCHUBERT in Germany, and FRANKLIN in America, wrote about it. Its use extended rapidly in France, and thence to North America,—the recently cleared lands there being most beneficially acted on by gypsum, according to the reports of the celebrated French chemist, BOUSSINGAULT. FRANKLIN, who had learnt of the use of gypsum in Paris, on his return to America, astonished the farmers there by strewing gypsum in a meadow, in the form of gigantic letters, spelling the word "gypsum," the effect being that the superior growth of the plants where the substance was placed, caused the letters to become plainly revealed.

As usual, however, the advocates of gypsum claimed too much in its behalf, describing it as a universal manure, advantageous for every kind of crop, beneficial to each variety of soil ; whereas experience soon proved that only certain plants, chiefly leguminous fodder crops (clover, lucern, sainfoin, &c.) were largely benefited by its application.

Towards the end of the eighteenth century, an inquiry into the action of gypsum as a manure, was instituted by the French Government, the chief points held to have been established being : i. That gypsum acts favourably on artificial meadows, although not if the soil is very damp ; ii. That it will not convert a barren soil into a fertile one ; iii. That it does not sensibly increase the crop of cereals.

The procedure of the French Official Committee, appears merely to have consisted in soliciting opinions

from various agriculturists as to the action of gypsum, and the inquiry was far from being exhaustive or decisive. Many points left untouched were independently investigated in France by M. DE VILLELE, and in England by a Mr. SMITH. SMITH'S results, (obtained 1792-1794) as regards the action of gypsum on cereals, were directly contrary to the decision of the French Committee. He found that the yield of grain on light soil was nearly doubled by the use of the fertiliser. Similar results attended his experiments with leguminous fodder crops. VILLELE'S experiments performed in the south of France, corroborated those of SMITH, as far as they went, but seem to have been confined to clover and sainfoin.

It is evident, however, that these early inquiries were undertaken at a time when the chemistry of agriculture was but little understood. The simple salt, gypsum, consisting practically of lime, sulphuric acid and water, being placed on the same footing as a complete fertiliser, such as guano or stable manure, which contains every thing requisite for plant growth.

The remarkable results achieved by gypsum in certain cases, however, were sufficient to attract the attention of scientific men, and to account for them, various theories have been from time to time put forward, and much controversy consequently excited.

Sir H. DAVY simply considered that gypsum benefited those plants that naturally contained a large proportion of calcium sulphate; and only when the soil was deficient in that substance was the benefit experienced. DAVY did not even regard the gypsum as a source of sulphur, or of sulphuric acid, or of lime; but that the mineral in its entirety was necessary to the

plants concerned. LIEBIG, whilst agreeing with DAVY that gypsum acted as a plant food *per se*, attributed its action chiefly to its power of absorbing and fixing the carbonate of ammonium, that SAUSSURE about that time had proved to be a constituent of air, and particularly that portion of it carried from the air to the soil by rain. In fact, LIEBIG regarded the application of gypsum as equivalent to manuring the soil with an ammoniacal salt.

Both theories were ably criticised by BOUSSINGAULT, who, indeed, seems to have had the best of the argument. He found from the analysis of ashes of clover that had and had not been manured with gypsum, that in each case the quantity of lime absorbed by the plant was out of all proportion to the sulphuric acid; so that the mineral could not have been absorbed in its entirety. As to LIEBIG'S ammonia theory, BOUSSINGAULT showed that to double an ordinary crop of clover, which a dressing of gypsum is well known to do, the rain falling during the growth of the plant, must have contained not less than $\frac{1}{17800}$ of its weight of carbonate of ammonia, or about four grains per gallon, whereas rain water certainly did not contain anything like such an amount. He further pointed out that if gypsum acted by supplying ammonia, it should benefit not only leguminous crops, but also those known to be increased by ammoniacal salts, which was not found to be the case.

BOUSSINGAULT, himself, considered that gypsum acted merely by supplying lime to the crops, but was in his turn confuted by WAY, who pointed out that the application of gypsum doubles the yield of red clover, an average crop (per acre) of which only contains 55 lbs. of lime; of white clover, containing 45 lbs. of lime; of

sainfoin, containing 34 lbs. of lime ; and of Italian rye grass, containing but 14 lbs. of lime ; yet, it is powerless to augment an average crop of turnips which requires 90 lbs. of lime, or of a similar crop of carrots requiring no less than 197 lbs. of lime.

That the action of gypsum could not be altogether attributed to the sulphur or sulphuric acid supplied by it, was also proved by similar facts adduced by WAY, who finally states that "the crops which are most benefited by the application of gypsum contain far less of either lime or sulphuric acid than those upon which this manure produces no kind of effect." While admitting that gypsum may exercise the function of absorbing and retaining ammonia, WAY considered its action in this respect superfluous, because he had indisputably proved that "soils have a power, quite independent of the presence of sulphate of lime, of retaining the carbonate or any other salt of ammonia that may be brought in contact with them."

More recent observers have sought in other directions for an explanation of the action of gypsum. Thus, an Italian chemist, COSSA, ascertained that water containing gypsum formed a more powerful solvent of the plant constituents of soil than water free from it. Water is able to take up about $\frac{1}{400}$ of its weight of gypsum, and this solution when allowed to remain in contact with the finely ground rocks, which go to form clay, dissolved out of them from two to three times as much potash, lime &c., as pure water is capable of doing, and thus probably aided the plant in obtaining its proper supply of mineral matter.

But by far the most important addition to our know-

ledge of the importance of gypsum as a fertiliser, has recently been contributed by WARINGTON, perhaps the foremost amongst English chemists in researches into the chemical minutiae of agriculture. In a former paper* I have drawn attention to the fact that ammoniacal salts, and other nitrogenous matters, become oxidised to nitric acid (or nitrates) in the soil, and that it is considered that this change is necessary before the nitrogen becomes assimilable by plants. The required change is brought about by a specific organism—a bacterium—discovered in 1877 by SCHLOESING and MUNTZ. WARINGTON has ascertained that nitrification is greatly aided by the presence of gypsum. Experimenting with diluted urine, he found that ~~whereas~~ water mixed with 12 to 15 per cent. of urine was practically unnitrifiable, (although weaker solutions were not) yet when gypsum was added, nitrification occurred sooner or later even when the proportion of urine was increased to 50 per cent. It appears from WARINGTON'S experiments that nitrification can not proceed in the presence of a certain small proportion of alkali, and as urine by decomposition develops ammonium carbonate, which is alkaline, the reason of the non-nitrification of the stronger mixtures is evident. By the addition of gypsum, however, the ammonium carbonate is destroyed, insoluble calcium carbonate and ammonium sulphate being formed, and as the alkalinity is thus removed, the nitrification proceeds. Other organic nitrogenous matters also become alkaline by decomposition, from the formation of ammoniacal compounds,

* Soluble vs. Insoluble Manures, *Timehri*, iii., 331.

probably carbonate, so that admixture with gypsum would facilitate their nitrification. WARINGTON, in his paper on the subject, states that "The action of gypsum in these few experiments is quite in accordance with the observations of others. Thus, PICHARD, (*Ann. Agrom.*, 1884, p. 302), experimenting on the nitrification of earth-nut cake mixed with sand, found that by far the largest amount of nitric acid was produced when gypsum was added to the mixture; he supposes, however, that the sulphate of calcium had acted simply as an oxidising agent, and that its effect was due '*à sa facilité d'être déoxydé au contact des matières organique et réoxydé au contact de l'air.*' JOULIE, also, in his experiments on the loss of nitrogen during the fermentation of farm-yard manure (*ibid.*, p. 289), found a formation of nitric acid only in those cases in which gypsum had been added to the mixture" WARINGTON concludes by saying that: "In agriculture, the activity of dressings of farm-yard manure would probably be increased by the addition of gypsum to the soil."*

Gypsum therefore is a many-sided fertiliser, and its functions as at present ascertained may be summarised as follows:—

I. It acts as a plant-food *per se* by supplying lime or sulphuric acid or both.

II. It is capable of absorbing and fixing ammonium carbonate from the air or rain, although its action in this respect is probably superfluous.

III. It renders the plant constituents of soil more soluble in water.

IV. It promotes nitrification.

* *Journ. Chem. Soc. Trans.* 1885, 758.

In discussing whether gypsum is advantageous as a cane manure in British Guiana, we will consider it first as a plant food. It is a well known fact that the soils of the colony are deficient in lime, and that they are deficient in sulphuric acid (or sulphates), was shown by the numerous analyses made by T. JAMIESON, of Aberdeen, whose report on the cane soils of the colony was communicated to the Royal Agricultural and Commercial Society by the late Hon. WILLIAM RUSSELL in 1880. JAMIESON found that of 134 samples from the various estates in which Mr. RUSSELL was interested, 14 samples contained no sulphuric acid detectable by analysis, whilst no less than 59 samples contained only traces. Taking also the analytical results of 145 samples of cane soils from various parts of the colony obtained by SIBSON, NEWLANDS, PHIPSON, SCARD, and myself, the mean amount of sulphuric acid present is only '08 per cent., the maximum being 0'2 and the minimum, a mere trace.

But the analysis of the ash of sugar cane shows that sulphuric acid is present in it in considerable quantity, perhaps even to a larger extent than phosphoric acid. Thus, according to the analyses of 12 samples of stripped cane made by STENHOUSE, the mean amount of sulphuric acid in the ash is 6'62 per cent., and of phosphoric acid 6'81 per cent. ; whilst PHIPSON found in the ash of a ripe cane including the leaves, 8 per cent. of sulphuric acid and only 6 per cent. of phosphoric acid. The importance of phosphoric acid is fully recognised, and is provided for by the abundant phosphatic manures used in cultivating the plant, but an equal importance is, by no means, attached to sulphuric acid, and canes have to

obtain their supplies as best they can. It so happens, however, that the manures almost exclusively used in the colony, viz., sulphate of ammonia, superphosphate of lime, and dissolved guano, supply not only the nitrogen and phosphoric acid they are intended to do, but also sulphuric acid, which they contain as a kind of minor constituent. It is indeed probable, as I pointed out in my paper on *British Guiana Cane Soils and Artificial Manures* (Timehri, i. 288), that the preference shown for sulphate of ammonia over other nitrogenous salts—chloride of ammonium, nitrate of soda, etc., reputed equally efficacious in supplying nitrogen—may rest on some more solid basis than mere fashion or caprice, and that it is actually found to be a better manure because it supplies sulphuric acid as well as nitrogen. A similar possibility also attaches to superphosphate of lime and dissolved guano, in the preparation of both of which, sulphuric acid is largely used.

To prepare superphosphate, ordinary phosphate of lime (or tricalcium phosphate) is simply mixed with a proper proportion of sulphuric acid, and kept for a time. The sulphuric acid gradually combines with two thirds of the lime, forming sulphate of lime or gypsum, leaving only one third in combination with the phosphoric acid in the form of a strongly acid salt called by chemists monocalcium phosphate. This mixture of gypsum and monocalcium phosphate with more or less of the original phosphate, and various adventitious impurities, is known commercially as superphosphate of lime. It will be seen that in applying superphosphate to the soil, gypsum is also applied, and it is a question whether any superiority exhibited by the superphosphate over insoluble phos-

phate, should not rightly be claimed, partly or wholly for the gypsum contained in it.

A superphosphate is now supplied by an eminent firm of manure manufacturers, from which the gypsum has been removed, so that it consists of nearly pure monocalcium phosphate. It would be an interesting experiment to try the effect of this preparation side by side with the ordinary kind, on land deficient in sulphates, using chloride of ammonium (not sulphate) to supply nitrogen in each case. It may also be pointed out here that in comparative trials of insoluble phosphates against superphosphates an equal weight of gypsum should be mixed with the former to equalise the conditions, otherwise, in one case gypsum would be present while absent in the other.

"Dissolved" guano is prepared in a similar way to superphosphate by adding to ordinary guano, sulphuric acid, which converts the phosphate of lime present into a mixture of monocalcium phosphate and gypsum, and the salts of ammonia into sulphate of ammonia. Increased efficacy is likewise attributed to the more ready solubility of the guano thus treated, but, if there be any superiority, it is quite possible it is due to the sulphate.

The treatment with sulphuric acid considerably increases the cost of the manures, and, as I have previously demonstrated,* it would be practising economy to no small degree if natural phosphates and nitrogenous matters were used in place of the expensive soluble manures now so much employed. As a substitute for

* Soluble vs. Insoluble Manures, *loc. cit.*

dissolved guano and the various cane manures made up of superphosphate of lime and ammonium salts, a trial might be made of a mixture of equal weights of dried blood, gypsum and finely ground South Sea Island phosphate.* Such a mixture would contain nitrogen equal to about 5 per cent. of ammonia, 27 per cent. phosphate of lime and 33 per cent. of gypsum. It should not cost more than two-thirds the price of a dissolved manure of equal strength, and I see no reason why it should not prove equally efficacious whilst it would unquestionably be much more lasting.

Respecting the action of gypsum in fixing aerial ammonia, I think the amount of ammonia present in air and rain too small for its effects in this direction to be appreciable. Owing to this property, however, gypsum is an excellent substance for mixing with decomposing pen or stable manure to prevent loss of nitrogen by ammoniacal emanations. It may also be recommended in place of dry soil, megass ash, etc., for mixing with sulphate of ammonia or guano to increase the bulk and insure a more equal distribution of the manures when they are being applied.

The property of gypsum in facilitating the decomposition of clay is probably an important one. Sugar cane requires plenty of potash, and also of silica in a soluble form. Silica, of course, is the principal constituent of clay, and potash also is present in sufficient quantity; but, the larger proportion of both is locked up in the form of insoluble compounds which are decomposed but slowly, and in some cases, it may be, not fast enough to

* Or West Indian phosphate, provided it contained 80 per cent.

keep pace with the requirements of the plant.* Deficiency of available silica is probably closely connected with the *asthenia*, (so prevalent in this colony) and other diseases of cane†; whilst encouraging results in cultivating the plant have attended an increased supply of potash, according to experiments now being carried out in the French islands, and by Prof. HARRISON in Barbados. If, then, the large stores of silica and potash locked up in the soil can be made more available by gypsum, it would be more economical to employ it for the purpose, being a cheap substance, than to supply potash salts and soluble silica, which are relatively much more expensive.

The property of gypsum in promoting nitrification would only be of service when organic nitrogenous

* In connection with this point it may be of interest to give the following extract from "A General System of Botany" by LE MAOUT and DECAISNE, translated by Mrs. HOOKER 1873, pp. 144-145. "Alkalies and especially potash, when mixed with soil, are rendered soluble by the addition of sulphate of lime as DEHERAIN has proved. Since the sulphate of lime changes the salts of potash into sulphate of potash it has been supposed that the greater solubility of potash after being thus treated is attributable to this transformation. This hypothesis has not yet been practically proved, and we do not know whether the sulphate acts chemically on the potash or whether its effects are purely physical, the object being to liquefy the soluble salts, to preserve them from the absorbent action of the earth, and to facilitate their absorption by the roots of the plant. But whatever be the explanation, this property of sulphate of lime proves the advantage of adding it to the soil in which leguminous fodders are cultivated (Trefoil, Lucerne, Sainfoin,) of which the ashes are rich in potash."

† See *Report on Sugar Cane Disease in the Mary River District, Queensland* by Prof. LIVERSIDGE. (*Sugar Cane*, 8, 544). The ash of healthy Rappoe cane contained 51.45 o/o silica and of the diseased only 13.6 o/o. The ash of healthy and diseased Troebce contained 22.82 and 11.36 o/o respectively.

matters, such as natural guano, oil-cake, fish, flesh, and blood meal, are employed to furnish nitrogen. Ammonium salts (sulphate and chloride) undergo the change to nitric acid without development of alkali, and, in their case, the aid of gypsum is not required.

Some six or seven years ago, I pointed out most of the above facts to the Hon. WM. RUSSELL who, thereupon, with his usual enterprise, commenced experiments with gypsum upon his estates. He frequently expressed approval of the results to me, and, no doubt, to others, for the use of gypsum rapidly extended, and it now forms one of the regular imports of the colony. A knowledge of the functions of gypsum is, however, not possessed by many who employ it; and expectations of largely increased yields of cane derived from its use have by no means been realised. As already explained, the manures usually employed contain sulphuric acid, so that gypsum used in addition to them is shorn of one of its chief advantages—that of supplying sulphur; also, when ammonium salts furnish the nitrogen required by the cane, the aid gypsum affords to nitrification is of no avail. Under such conditions, its only remaining property of importance, as far as at present known, is that of increasing the solvent action of water on clay, and this may be of limited utility. To give gypsum a fair chance, it should be tried with nitrogenous organic matter and insoluble phosphates, against the soluble manures now employed. Gypsum is the cheapest sulphate known, and if, by its aid, the usual manures could be supplanted by natural phosphates and nitrogenous matters, the saving to planters would be very great.

West Indian Produce in 1815.

THE following list of prices current of West Indian Produce in Liverpool in December 1815, with the additional information, has been forwarded to me for insertion by Dr. C. G. YOUNG, who has compiled them from old papers in his possession. Somewhat similar lists of the prices of Demerara sugar current at nearly the same time, have been previously published in the newspapers; but the present list gives a comparison not only of sugars, but of the Demerara and West Indian produce in general. Many of the articles such as Ginger, Allspice, Pimento, &c. do not figure on the export list of Demerara; but they afford an interesting comparison as to the trade of the islands; while the information as to the amounts imported, the duties payable, and the state of the market, gives an idea of the colonial industries at a time when the importance of the possession of the West Indian islands was fully recognised—*Ed.*

SUGAR, British Plantations.—Present duty on Muscovado 30s.—Clayed 35s.

Sugar may be warehoused for fifteen months and at present re-exported duty free.

Prize is warehoused for exportation on a duty of 9s. 6d. per 112 lbs if taken by a King's ship.

Prize is warehoused for exportation on a duty of 3s. 6d. per 112 lbs. if taken by a private ship.

Foreign, (not Prize) is warehoused for exportation free of duty—and if of the produce of Martinique, Mariagalante, St. Eustatia, St. Martins or Saba, is admitted for home consumption on payment of the duties payable on British plantation.

Sugars, until the average weekly price of such last mentioned Sugars for 4 weeks successively, as published in the *London Gazette*, shall be less than 35s. per cwt. exclusive of duty.

MUSCOVADO.		VERY FINE.						
Prices—Duty included.		S. S.						
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MUSCOVADO SUGAR.

Stock in Importer's hands 31st December, 1814	...	8,000 Hhds. & Tcs.
Imported since	... ..	46,000
(being 5,600 Casks less than in the first 11 months of 1814.)		
Sold in these 11 months by Importers	...	47,500
Leaving on hand	... ..	6,500

The quantity of plantation sugar imported so far in this season, it will be observed, is 5,600 casks less than up to the same period last year, and the whole year's supply will also fall short ; but 41,700 casks only were sold in the first 11 months of 1814, and the average quantity disposed of in the same period for the preceding three years amounted to about 39,700 whereas it is worthy of remark, that 47,500 casks have been sold in the past 11 months, and our present stock is less than usual at this season—last year it exceeded 10,000 casks, exclusive of a heavier quantity than at present in second hands. The stock remaining at Glasgow is not half what it was this time last year, while in London and Bristol together it is somewhat more, and prices now rate greatly below what they did then. Upon the whole, therefore, the annexed quotations may reasonably be expected to be maintained, and any considerable exportment would occasion some advance. The demand for the two last months has not, however, been equal to the desire of holders to sell, and we again reduce our quotations 2s. per cwt. this month. A public sale of 200 hhds. this day has gone off briskly, and the finer sorts rather higher than the annexed prices :

FOREIGN SUGARS.

		Casks.	Chests and Boxes.
Stock remaining from 1814	...	500	3,000
Imported since ... ..	...	1,660	21,200
		<u>2,160</u>	<u>24,200</u>
Delivered ... ..	...	1,560	21,300
Leaving in store ... ..	...	<u>600</u>	<u>2,900</u>

Being considerably less than remained at the end of November for years past, although our import this year has been three-fold; prices have declined a little this month, but not materially, and as there is no superabundance of sugars on the continent, and we know not of any considerable supplies being soon expected, they will probably keep pretty steady. The demand as usual, however, at this season is very limited.

Molasses—Duty 7s. 6½d., p.c.—French, 26s. to 31s.; Dutch, 25s. to 26s.; St. Vincent &c., 26s. to 32s.

Molasses—A superabundant supply at market, and little demand: prices therefore partly nominal.

Rum, British plantations.—The Customs duty, which is 1s. 2½d. per gallon, being refunded by the buyer, this article is sold at the nett price.

		S.	D.	S.	D.
Jamaica, 10 to 16 o.p. ... ..	...	3	6	to 4	0
„ 18 „ 20 „ .. ..	...	4	0	„ 4	3
„ stronger ... ..	...	4	3	„ 4	9
Windward Islands, nls. ... ..	...	2	10	„	—
„ prf. and 5 o.p. ... ..	...	3	0	„ 3	2
„ 7 a 16 o.p. ... ..	...	3	3	„ 3	8
„ stronger ... ..	...	3	10	„ 4	3

Of Rum, there have been imported in the 11 months

4,007	puncheons from Jamaica
2,637	„ „ the other colonies
<u>6,644</u>	puncheons.

In the same period last year, the import amounted to 13,574 puncheons. During the last month, 399 puncheons have been delivered for home use, and 177 puncheons for export; leaving our stock about 3,500 puncheons. The demand for rum has now been for several weeks extremely limited, chiefly owing to the continued depression of the London market, where the stock is large, and where prices, particularly of Jamaica rum, have ruled much lower than with us. The article has consequently declined a little here, and is so little sought after that our present quotations are almost nominal, but not likely to go much lower, as our stock is very moderate and no further supplies of any importance soon expected.

COCOA, B.P.—Warehoused free of duty for exportation. Prize, King's ship 5s. 11½d. per 112 lbs.; private ship, 1s. 11¾d. per 112 lbs.

Grenada	...	...	...	76s.	to	84s.
Surinam	...	...	...	100s.	"	115s.
Triandad	...	...	..	165s.	"	180s.
Spanish	...	...	...	76s.	"	84s.
Carracca	...	...	..	190s.	"	210s.
Brazil	...	...	...	72s.	"	78s.

2,400 Bags imported so far as this year, and our present stock is moderate—indeed the article being chiefly of Spanish and Portuguese Colonial growth, less will probably come this way in future. Carracca and Trinidad qualities have been the most saleable, but of late have become much less so; and as the wants of the Navy will henceforth be inconsiderable, the vent for common Cocoa will be more limited—indeed of late these descriptions have been quite neglected, and prices are merely nominal.

COFFEE.—B.P. Excise and Customs duty for home use 7s. 4d. per cwt., paid by the buyer, but may be warehoused for exportation, duty free.

Prize, warehoused for exportation, 16s. 7½d. per 112 lbs., if taken by a King's ship.

Prize, warehoused for exportation, 5s. 6½d. per 112 lbs. if taken by a private ship. (Paid by importer).

Foreign (not prize) for exportation—duty free.

PRICES IN WAREHOUSE.	Triage.		Very Ord. & Mixed.		Ordinary to Fine Ord.		Middling & Good Midd.		Fine Middling.		Fine.	
	S.	S.	S.	S.	S.	S.	S.	S.	S.	S.	S.	S.
Jamaica	31	46	53	57	60	67	70	82	87	91	95	100
Martinique & Dominica...	32	44	—	—	65	72	75	84	87	91	95	98
St. Lucia, Trinidad, } Grenada & St. Vincent's }	32	44	57	61	63	70	74	82	86	90	92	94
Demerara, Berbice and } Surinam }	40	58	58	62	64	70	73	82	86	90	92	94
Prize or Foreign . .	32	46	56	62	63	68	70	78	81	89	—	—
St. Domingo	33	40	61	65	67	70	72	76	none.	—	—	—
Havanna	33	40	56	60	61	64	65	70	73	78	—	—

The quantity remaining in Warehouse on 31st Dec. last

was estimated to be 9,000 Tons.

Since imported 5,000 „

14,000 „

Being 2,450 tons less than in the first 11 months of 1814.

Reported in these 11 months 7,500

And taken for Home Use 500—8,000 „

Leaving in Store 6,900 „

Being 2,300 tons less than remained at this time last year; but our import in the last 11 months, it will be observed, has been 2,450 tons less than in the same period of 1814, and 300 tons more have been delivered this year, so that our stock, although yet considerable, is on the decrease.

Comparatively, the stock of West India coffee in London is still less, but that of Java, &c., is very heavy, and most of the continental markets appear to be pretty well supplied with all descriptions. Prices have therefore again declined last month, and the demand is so inconsiderable, (as indeed is usually the case at this season,) as to render quotations partly nominal, nor do we look for any improvement during winter, although probably some may take place when trade re-opens in spring. Coffee, the growth of the B.P., should always be accompanied with complete certificates of its being such, in order that it may have the advantage of the demand for home use, as well as for exportation, and more especially now that the inland duties are so greatly reduced as to insure a considerable home consumption. Coffee cannot be legally imported in packages weighing less than 100 lbs. nor cocoa less than 112 lbs. nett.

GINGER.—Duty 22s. 11½d. per 112 lbs., but may be warehoused for Exportation free of duty.

Jamaica, Duty paid, White .	140s.	to	230s.
Black ...	120s.	"	130s.
Barbados White...	160s.	"	170s.
Do. Warehoused ...	140s.	"	150s.

450 Bags only imported this year, and as little of it remains, prices are quite arbitrary: any considerable supply would, however, occasion an immediate depression.

COTTON, imported in a British ship from any quarter, or a Portugues ship from Brazil, or an American from the United States 8s. 4d. per 100 lbs., otherwise Foreign Ship 25s. 6d. per 100 lbs.

	...	...	...	...	2s. 6d.	to	2s. 7d.
Pernambuco	...	...	...	...	2s. 6d.	to	2s. 7d.
Bahia	...	...	...	...	2 2½	"	2 3½
Maranham	...	...	...	...	2 1	"	2 2½
Para	...	...	...	...	2 0	"	2 1
Mina	...	...	...	...	2 0½	"	2 2
Rio	...	...	...	...	1 10	"	2
Cayenne	...	...	...	...	2 3	"	2 4
Surinam	...	...	...	...	2 2	"	2 4
Demerara & Berbice	...	...	...	...	1 11	"	2 4
Porto Rico	...	...	...	...	2 2	"	2 6
Grenada	...	...	...	...	2 1	"	2 2
Carriacou	...	...	...	...	2 2	"	2 3
Barbados	...	...	...	...	2 0	"	2 1
Guadaloupe	...	...	...	...	2	"	2 1
Camana	...	...	...	...	1 9	"	2 0
Giron	...	...	...	...	1 10	"	1 11
St. Andrees	...	...	...	...	1 10	"	1 11
Jamaica	...	...	...	...	1 10	"	2
St. Domingo	...	...	...	...	1 9½	"	1 11
Bahama	...	...	...	...	1 8	"	2 4
Trinidad	...	...	...	...	1 10	"	2 0
Carthagena...	...	...	...	...	1 9	"	1 10
Laguaira	...	...	...	...	1 8	"	1 9
America—Sea Island	...	...	...	...	2 4	"	3 0
Very Ordinary	...	...	...	...	2 0	"	2 2
Up land	...	...	...	...	1 5	"	1 8½
New Orleans	...	...	...	...	1 6½	"	1 10
Tennessee	...	...	...	...	1 6	"	1 8

The import amounted to

First 11 months 1814 from America	40,420 Bgs.,	in 1815	153,690 bgs.
Brazil & Lisbon	98,030	" " "	51,860 "
Dutch Colonies	16,460	" " "	17,350 "
Other parts	17,720	" " "	13,250 "
	<u>172,630</u>		<u>236,150 "</u>

Shewing an increase in the supply of this year of 63,500 bags of the justest weight. The import last month has been 13,450 bags, of which 7,500 were from the United

States, and 5,600 from Lisbon and Brazil, and the sales in the same time about 20,000 bags, of which only about 2,000 were taken by Speculators, so that the stock has decreased about 5,000 Bags since our last report. The demand during the whole of last month has been rather languid, and prices have gradually declined, until they now rule 2d. to 3d. per lb. below our last quotations ; at this depression, there has latterly been more disposition to purchase on the part of the Trade and Speculators, but holders, particularly of American Cottons, being generally disposed to effect sales before the new crop comes to market, prices do not improve ; yet as they are now, on the average, as low as at any period of the present year, and the state of the manufacture great and flourishing, it is probable that no further decline will take place ; but on the contrary, that a continuance of a fair demand, with a moderate degree of confidence on the part of the holders should readily produce some amendment.

PIMENTO.—Duty 9½d. per lb. but may be warehoused free of duty for exportation.

Duty paid	...	...	...	...	1/6½d. to 1/7½d.
Warehoused	...	...	...	...	0/9 to 0/10

3,600 bags imported in these 11 months, and 2,300 bags are supposed to remain ; the present stock in London is moderate, but the demand at this season is usually very limited, and prices if anything are rather lower.

TORTOISE-SHELL, in demand, 25 to 27 shillings per lb.

MAHOGANY.—Duty, if imported direct from Honduras or the Bahamas £3 16s. od. per ton—from any other place £11 17s. 6d. per ton.

Honduras	...	...	...	...	1/od. to 1/4d.
Cuba	...	...	...	...	1/3 to 1/6
St. Domingo	...	...	...	...	1/6 to 2/4

In the 11 months there have been imported 3,560 logs, against 2,396 logs imported last year. The demand for Mahogany is limited, and some heavy parcels of St. Domingo having been pressed on the Market lately, prices have given way.

LIME JUICE :—Duty 1s. 2½d. per gal. 6s. to 6s. 3d.

LOGWOOD :—Duty 9s. 1½d. per ton.

Jamaica	...	..	...	...	£10 os.—£10 10s.
Campeachy	...	...	...	...	13 10 14 0
Honduras	...	...	...	...	12 0 0 0
St. Domingo	...	...	...	...	11 0 11 10

FUSTIC.—Duty £1 4s. 6½d. per ton.

Brazil	...	...	..	...	£9 os. £13 10s.
Jamaica	...	...	...	...	13 0 14 0
Porto Rico	...	...	...	...	11 0 12 0
Cuba...	...	...	...	...	16 0 16 10

NICARAGUA WOOD.—Duty £1 6 1½ per ton.

Rio de la Hoche large £33 os. £34 os.

"	"	small	} none or uncertain.
Santa	Martha	large	
"	"	small	

Dyewoods generally have continued very flat, and some parcels of Logwood have been occasionally forced off at lower prices; there is, however, no general disposition to sell at present rate, and any improvement of demand, which may be expected at the reduced currency, would probably cause prices to rally a little. There is likewise so little enquiry for Fustic and Nicaragua wood, that prices are almost nominal.

Import of Logwood in 11 months 2,468 Tons, against 3,582 Tons last year.

"	Fustic	"	1,690	"	"	2,773	"	"
"	Nicaragua Wood	"	529	"	"	744	"	"

HIDES.—Duty 9½d. per hide in a British Ship.

West Indian Dry per lb.	...	...	os. 6d.	to	os. 7½d.
„ Salted „	...	...	0 5½	to	0 6½
Buenos Ayres Dry „	...	...	0 7½	to	0 9½
„ Salted „	...	...	0 4	to	0 5½
Brazil ...	...	...	0 7	to	0 9½

The import of Hides in the 11 months has amounted to 210,052 in lieu of 213,290 imported in the same period last year. We have latterly experienced a regular demand for good Buenos Ayres Hides, and parcels as imported have met a regular sale at 9d. for a good average quality, at 9½d. and 9¾d. for fine, and as there is still a good enquiry for export, and no great quantity on hand, those rates are likely to be maintained. Of Brazil or West Indian Hides there are so few at market that prices of such are rather uncertain, but we should calculate on realising the prices we have quoted.

INDIGO.—Duty 4¾d. per lb.

Carraccas, Cortes	...	...	5s. 6d.	to	7s. 0d.
„ Lobres	...	...	7 6	to	9 0
„ Flora	...	...	9 6	to	11 6
Guatemala Cortes	...	...	4 3	to	6 0
„ Lobres	...	...	6 9	to	8 6
„ Flora	...	...	9 6	to	11 0

Of this article our stock is so small that prices are regulated by the London market. A pretty considerable importation in a ship from Bengal, which was brought to public sale last month, sold readily at about the London prices.

COCHINEAL.—Duty 2s. 4½d. per lb., 35 shillings to 38 shillings.



Popular Science Lectures.

INAUGURAL LECTURE.

By G. H. Huxley, C M G, F.R.G.S., C M Z.S.



HAVE been asked to deliver the first of a course of lectures on Popular Science under the auspices of our Society, as I happened to be the proposer of a resolution at one of our meetings that such a course of lectures was desirable, and that the Society should make the necessary arrangements. I feel that in the performance of this duty I require your indulgence and support, because one may have been a science-student in one's youth, and may have learned to appreciate the progress of science and its manifold benefits, without having mastered the details of any one branch of it; and in my case, I am conscious that I am addressing, or may hereafter be followed by gentlemen who are by profession scientists, and that it is almost impertinent in me to even touch upon what they are so thoroughly acquainted with. However I will to the best of my ability do what has been required of me, and I can only ask you to give me your kind attention and to be lenient in your criticism.

I propose briefly to review what has been done in the advancement of scientific knowledge and the application of science to practical ends during the past eighty-eight years, and to refer to some instances of how much we are indebted to science for many of the advantages and

comforts we enjoy. It is true that in remoter ages science was cultivated to an extent of which we can hardly judge by what has descended to later times, and that probably all science had its birth in bye gone ages. May we not say there is nothing new under the Sun? Astronomy was known to the Chaldeans—Metallurgy to the Phœnicians—Chemistry to the Arabians; and who can look at the Pyramids without acknowledging that their builders knew something of the art of construction of which we are ignorant; and so through the long line of ages we meet here and there with traces of “lost arts” or come across the germs of what in our time has blossomed into more perfect and beneficent science.

But we must, I think, agree that this 19th century which is rapidly drawing to its close, will be distinguished above those preceding it by the extraordinary progress which has been made in scientific knowledge and the application of that knowledge to furthering the prosperity and happiness of the human race. The history of previous centuries contains, in comparison, little else than the record of wars and political or religious changes—and though it is not forgotten that prior to 1800 were made the discoveries which immortalized the names NEWTON, HERSCHEL, FRANKLIN, PRIESTLEY and others, still, the advance of scientific knowledge was for years comparatively slow, and its practical results not immediately perceptible.

Perhaps no result of practical science has contributed more to the improved condition of our times, and the marked difference between then and now, than the largely increased facilities of communication by land and water which we enjoy. Thanks to steam and

engineering skill, the scattered people of our Empire and the various nations of the world have been brought nearer to each other, international commerce has received a wonderful impetus, and increased exchange of products has brought about larger and cheaper supplies.

There is a great change from the olden days when a voyage hence to England took many months, and when the perils of the deep were such as to render prudent the making of wills and other settlement of human affairs, as though the traveller were starting for another world instead of another hemisphere; whereas now, the punctual arrival of the steamers engaged on the longest voyages can be reckoned on with almost certainty. A few days' journey takes us hence safely and comfortably,—if one is a good sailor that is, please remember—to England, and then we can hurry from place to place with a speed approaching a mile a minute—I am not speaking of our Demerara Railway. We can turn in to a comfortable couch at night and sleep uninterruptedly, until next morning when we awake at our destination—a marvellous contrast to the old coach days when speed was slow, and accommodation, to say the least, uncomfortable.

The railway traffic of the United Kingdom exhibits besides ingenious application of scientific principles, perfection of organization; and when we think of the millions of passengers conveyed every year by rail and the great risk arising from high rate of speed—hidden defects in material or workmanship—and want of caution, we may well wonder at the way in which this traffic is conducted so as almost to ensure immunity from disaster. To appre-

ciate this one ought to see some important station through which hundreds of trains on many converging lines pass every twelve hours—with its labyrinths of rails and constellations of bright signals, with engines rushing at apparently reckless speed to what looks like certain destruction, and to see how amidst all this apparent confusion perfect order reigns.

Some idea may be given of the progress of railways at home by the fact that 40 years ago there were 58,000,000 passengers carried over 5000 miles of railroad in the United Kingdom. In 1885—815,000,000 travelled over 19,000 miles and no less than £66,000,000 sterling were in that year received for traffic of all kinds.

It is amusing to recall the disfavour with which the innovation of railroads was regarded and the opposition raised. There were all sorts of catastrophes predicted, and some present may recollect the comparison drawn by the old mail coach driver who said "Well, if a wheel *do* come off and yer coach capsizes and the passengers get chucked into the road well *there* ye are—but if one of them things runs off the rails and the engine busts why *where* are ye?"

These increased facilities of locomotion have worked wonders in communication by post. The number of letters, papers and post cards sent daily from all parts of the empire is simply astounding. Cheaper postage has been rendered possible by cheaper means of conveyance, and reduction in postage rates has been more than compensated by increased revenue from the large amount of letters sent. It is impossible to over-estimate the part which cheap means of communication have played in keeping up the connection between colonists and home

friends, and so strengthening the links between the mother country and her distant possessions. There is now being made a vigorous attempt to still further reduce postal charges, in the belief that an universal rate of even one penny will so encourage correspondence that no loss of revenue will result.

Development of Electrical Science is another great feature of the century. From FRANKLIN with his kite and Signora GALVANI'S lucky interference with her husband's laboratory arrangements, what an enormous advance is there to the present position which electricity occupies in relation to science and art! The discovery that a current passes between two pieces of metal when connected—that this current renders the magnetic needle no longer "faithful to the Pole" but that with the direction of the current, the position of the needle changes, has been worked out until it has resulted in the Electric Telegraph. Very different this from the old Semaphore of which we have an example here, with blackened limbs that slowly and only in clear weather jerked out messages legible at but short distances. We have doubtless all read of the old days of the threatened invasion of England by NAPOLEON, when these lifeless posts were watched with anxious eyes for the expected signal of the invaders' landing. Now the telegraph is sleepless and sends its continuous stream of messages in all seasons across long stretches of land and under the wide ocean itself. And, as if the wonders of electricity were inexhaustible, we have the telephone. It is hoped that one of the lectures to follow this will be on electricity, and we shall have the advantage of learning from a practical electrician all about telegraphs and the ingenious modes by which

transmission of vibration is effected through electricity, bringing to us in place of the click clack of the telegraph the very voice of our telephone correspondent.

Looking at these two marvels of modern science, is it too much to hope that some day, far distant scenes may be brought as vividly to the *eye* as distant sounds are now conveyed to the *ear*? It is, we must remember, but a question of transmitting undulations or vibrations, and there are certain relations between sounds and colour which, as yet imperfectly understood, are nevertheless recognized, and are being patiently worked out. We recollect how the blind man thought scarlet was like the sound of a trumpet, and now we hear, that certain lights, yellow for instance, affect the sense of hearing. Electricity or electro-magnetism seems destined to become one great source of motive power whenever steam, from exhaustion of coal deposits or other causes, ceases to be the most available or cheapest.

There is another, if minor result of applied electricity to which we are indebted for the more sightly and cleanly electroplated articles we now use compared with the pewter things of former days. The old system of coating or veneering inferior metal with gold and silver by mechanical pressure has almost entirely been superseded by the discovery that metals may be deposited from their solutions by means of electricity. I need only refer to the creation or reproduction at moderate cost, of art objects equal in appearance to the most valuable work of ancient or modern artists. By means of this same electro-plating or electro-typing, engraving can also be effected. With the help of photography a picture is thrown on to a plate of gelatine coated

with a salt which, on exposure to light, renders the gelatine insoluble. The parts of the picture which remain unaffected are reduced or removed by washing, and from the image in relief thus obtained a mould is taken in which copper is deposited by the ordinary electrotypes process, and the resulting block used in the printing press. Thus we are enabled to draw and engrave without pencil or burin—almost without touch of hand.

Perhaps no greater scientific marvels have arisen during the century, than those derived from a closer knowledge of the properties of light. The discovery of certain rays called actinic rays and their effect on chemical substances gave us photography. No art has become more popular—few more useful. Apart from the service rendered in preserving the likeness of absent or departed friends, or in making known to us the features of those who are creating the history of our day, in bringing before us places and scenes we have visited, or others we may never see, it also is the means of producing, at little cost, copies of pictures and statuary, and so contributes to that greater appreciation of art which has sprung up during the last 40 years.

Photography is also a valuable means of noting the progress of works of construction, and so constituting a periodical and unerring record. It is besides this employed as an ever-watchful never tiring recorder of astronomical phenomena. Clever mechanical appliances have more recently made it available for taking instantaneous portraits without the knowledge of the sitter and this adaptation is useful for police purposes.

At present, as you are aware, photographs are monochromes—all of one colour. Attempts to reproduce the

natural colours of a landscape or a face have hitherto failed. There is, however, a legend that in the earlier days of the art, a wretched looking lad left at an optician's shop in Paris a photograph in natural colours and promised to return and show how it was done; but he never was seen again and so the secret was never divulged.

It was in 1701 that NEWTON discovered the chromatic prism, as it is termed, and beyond the fact that a ray of sunlight admitted into a dark room through a round hole, and traversing a three-sided glass, gave a rainbow coloured band of light, nothing was done or much thought about it for a hundred years when it was found that if for a round hole a narrow slit was substituted, the coloured image was crossed by innumerable black lines, and that when light from bodies other than the sun was employed, the number and position of these dark lines differed accordingly as this or that source of light was used. The flames from spirit of wine in which a chemical salt had been dissolved were then used, and it was observed that each salt, lime, soda, potash—whatever it might be gave its peculiar spectrum. It would take too long to dwell more on this discovery which affords so delicate a means of chemical analysis that it is said that the two-millionth part of a grain of sodium—a more than homœopathic dose—is sufficient to produce its characteristic band. The composition of the planets or their atmospheres has been ascertained by thus analysing the light they shed. I hope, however, that we may induce our friend, Mr. FRANCIS, some evening to shew us all about this “spectrum analysis” as it is termed.

Polarization is a term, and the polariscope an instru-

ment in such common use among the planters of the colony, that the theory of polarization is probably as well-known to every one connected with sugar, as its practical application. It is an abstruse subject—polarized light—requiring diagrams for its elucidation, and as I am only mentioning—not describing these triumphs of science it may be sufficient to remind you that a beam of ordinary light transmitted through certain substances or reflected from pieces of common glass, undergoes a change and becomes polarized. A ray of this polarized light passed through, for instance, a column of syrup and viewed through an arrangement of spar indicates by certain changes of colour the presence, and the degree of cane or grape sugar present in such syrup.

The Polaroscope in its simplest form is easily made and though a more complete instrument is required for purposes of exact analysis, yet with such an one as an amateur can make interesting results may be obtained.

I have omitted, but have not forgotten to mention electricity as giving us what may be termed the light of the future, "electric light." It is to be regretted that its more general use has been so long retarded by difficulties which will no doubt be overcome in time, when we may see it introduced in the streets if not the houses of this city. The purposes for which electric light can be employed are many, one of the most curious being the lighting on his submarine road the pearl fisher of the East.

While on the subject of light I may refer as another instance of the benefits derived from science, to the discovery of petroleum and the means of refining it so that in place of the dim rays of the old, cheap and nasty

candle, even the poorest house has a brilliant and inexpensive light; and although there is danger in the use of an impure oil, as many in this Colony have learned to their cost, properly refined oil is comparatively safe, and improved forms of lamps will probably render it entirely so. The introduction of coal gas was a marked advance on the lighting of our streets by the old oil lamp blinking from the top of a post or slung across a cord, as in Paris, in the old Revolutionary times, when the cry of *à la lanterne* referred to the ready means which the lamp rope afforded of getting rid of a political opponent. In like manner we advanced from the old flint and steel, (and some present may remember how one used to chip one's fingers in attempts to knock a light out of the obdurate flint) to the Congreve that had to be wiped between folded sand paper and thence to the modern lucifer or friction matches which are made in such huge quantities.

In the application of chemical science the century has been most fertile, and the most profitable instances are perhaps those in which there have been produced from waste and refuse, substances of great value. Amongst such refuse Coal Tar holds a prominent place. From this not over nice substance many useful disinfectants such as Carbolic Acid and its potent if malodorous allies are obtained. Of Coal Tar products the Society possesses an interesting collection presented by Mr. FIELD. Besides these, perfumes which are the delight of dainty dames are extracted from this repulsive source, as well as many of those flavours which to unsophisticated childhood form the chief charm of cheap lollipops. With one Coal tar or pitch product you can dye your stockings, and with another blow up your enemy. Again, a certain

chemist thought that Coal Tar might yield a cheap substitute for quinine, and in his endeavours to find it, he stumbled on aniline dyes, a discovery which brought him at the outset £30,000. Still later, it has yielded that wonderful artificial sugar which it was feared would supersede the Cane product, and so cause Sugar plantations to become howling wildernesses.

One of the most useful discoveries is that of anæsthetics, of which Chloral and Chloroform are the best known types. By these, suffering is prevented or at least allayed, and they are a boon to both patient and operator. Chemical means of producing extreme cold have been utilized so that ice can be produced in the tropics for less than it can be imported, and this artificial freezing has been largely used in conveying immense supplies of meat and of fruit from the Antipodes to the English Markets. We in British Guiana must hope that in the development of a fruit trade for which the colony has such abundant material and is so admirably adapted, these means of preserving in transit our more tender fruits will be found practicable and of value.

Chemical inventions have also superseded the one explosive of former days, gun powder, by gun cotton. I remember as a school boy how we all went in for manufacturing this delightfully dangerous compound, and how one impatient lad hastened the process by drying the product of his experiment in the oven, the result being sending the oven door into the middle of the kitchen, and the cook into hysterics. Other explosives have also for certain purposes supplanted gun cotton—nitro-glycerine, dynamite and other similar compounds being extensively used in mining as well as for other less innocent purposes.

One other result of advanced chemical skill has been the great amount of clever adulteration of which we in these later days are the victims

"Humbug has now the snuggest of monopolies

"Everything is anything but what it seems,"

as CHARLES MATTHEWS used to sing. Our forefathers were comparatively honest men. Take butter for instance. What could be more innocent and unsophisticated? The cows—the cowslips in the daisied meadow—the clear cool stream—the honest farmer and his comely wife—the natty dairy maid with dimpled hand—all were in olden days guarantees for the genuineness of butter, but *now*, thanks to Chemists, offal fat and scrapings from shambles and other impure sources yield what is or was sold as the real articles. Again Beer—(we recollect how any one who would rob a poor man of his beer, was denounced)—is not above suspicion, and there is now and then a cry that strychnine is substituted for hops, and that the light beers now in vogue are made with salicylic acid. In every manufacture, so some say, there is fraud and deception. If this is the case—if by chemists' skill these things are possible—by chemists' skill they can be detected—and when detected—ah! well in bye-gone days the baker who adulterated his bread was nailed by his ears to his door, but such ordinances have been repealed.

The period under review has been also rich in the invention and progress of machinery and everything connected with metals. In this the mother country has, owing to her mineralogical wealth, taken the lead.

Machinery has to a large extent imitated and superseded that wonderful piece of natural mechanism—the

human hand. Cunningly devised and skilfully arranged pieces of metal are now made to move in one harmonious whole, as if endowed with intelligence, and the result is an enormous gain in precision and rapidity of production with consequently greater cheapness. Marked progress has taken place in all kinds of machinery. The old steam engine is a clumsy arrangement compared with that of to-day, with its easy motion and lines in which the enthusiastic engineer sees as much beauty as does the sailor in a well designed hull. The spinning machines with their thousands of spindles, and the power loom giving out miles of woven fabric are far in advance of the simpler hand-worked machines of the earlier part of the century—and to improved processes in printing, for which we are in large measure indebted to the inventive genius of our American cousins, we owe that supply of cheap books and newspapers which is one of the characteristics of these modern days. Those who have had an opportunity of comparing the old press with which the *Times* newspaper of earlier days was worked off, with the huge presses now used by all the leading papers with vertical cylinders of type and automatic processes of various kinds, requiring the care of but a few attendants, must be struck with the wonderful difference in this respect between “then and now.”

I need not attempt to enumerate the various ways in which other machinery has been improved, and the points of difference between the old and the new, nor do more than allude to the increase in production and decrease in prices which have been brought about by means of machinery—and yet there were often riots and bloodshed in attempts to prevent the introduction of

machinery lest it reduced wages and caused over-production! But we of to-day cannot cast a stone at these misguided people of a hundred years ago. Have we not at home, now, combinations of workmen, who striving to keep down production and to unduly raise wages and shorten hours of labour, are driving much of the manufactures of England into the hands of foreigners.

In addition to those works which are designed to contribute to the well-being of mankind, excellence in mechanical skill has been employed in the perfection of instruments devised for the better killing of our fellow-creatures. The amount of talent and patient industry expended in making a torpedo for instance, or even a quick firing gun is something wonderful. It may be that we are progressing towards such perfect power of destruction that wars will cease merely because they will be so terrible; but it does seem a matter for regret that so much time, money and ingenuity should be spent on weapons and projectiles as if they were means of conveying the greatest happiness to the greatest number, instead of consigning the greatest number to the greatest misery in the least possible time.

To come now more immediately to our colony and ourselves.

Besides those advantages which modern science has given to the world generally, we in British Guiana must acknowledge the debt which we in particular owe to it in connection with our staple product. Chemistry has enabled planters to appreciate the quality of the soil they till, and learning in what materials it is deficient, to obtain these requisites in compact and concentrated form. It has been brought to bear upon the purification

of the juice of the cane and the perfection of its crystals, as well as in the utilization of its refuse, and it is to Chemistry we must look in a great measure for the development of many of those other products which in time will, it is hoped, supplement our sugar as sources of livelihood to our people, and of revenue to the Colony. In estimating the value of a fibre plant, for instance, important items are the amount of substances other than fibre present in the plant which hinder its economical and ready preparation, and the facility with which these undesirable matters can be removed. Chemical skill will detect and provide the means for getting rid of these. We have a variety of plants producing oils of different kinds, and all more or less valuable. In the preparation of these, as well as in ascertaining the purposes for which each is fitted, the chemists' help is necessary. Experts at home have loudly praised some of our oils and gums, and the only thing requisite seems to be a continuous and ample supply. Our many medicinal plants contain active principles which the chemist can obtain in a form fit for use—and in short the colony is rich in variety of products which by the aid of chemistry can be made available and profitable.

Mechanical skill and invention have been and are constantly directed to obtaining greater powers of extracting the juice of our canes and of economizing fuel, the result being the cane machinery of to-day.

This, it is true, many regard as far from perfect, and it may, as it has superseded the old cattle or windmill, be in turn thrown aside for some new process such as diffusion. No one I think can ignore the persistence with which new and varied improvements in the manufac-

ture of sugar are constantly brought forward. We may claim for the sugar-planter of—at all events *this* colony—that his energy and indomitable perseverance in fighting against all the difficulties, natural and artificial, which beset him are almost heroic, and he is to be congratulated on the near prospect of freedom from the unfair and overwhelming burden imposed by the system of bounties. And here, although you my Lord, in another place, and our President at the last meeting of the Society have in eloquent terms paid a fitting tribute to the worth of the late Mr. RUSSELL, I may, while dwelling on the advances which have been of recent years made in the Sugar Industry of the Colony, be allowed to say that much of that progress is due to the genius—energy—and perseverance of him who was rightly termed our Sugar King. In his death, not only that industry but the whole colony has experienced a great loss, and in no respect is this loss greater than in the removal of a bright example to our young men, no matter what their origin or their occupation. Mr. RUSSELL'S life shewed what was possible to the humblest beginner, if he only will practise industry and self-denial, and avail himself of every opportunity of acquiring a thorough knowledge of the scientific principles which underlie the successful prosecution of any and every industry.

I trust that in thus recalling to your recollection these examples of the vast advance in scientific knowledge and its application, of which we enjoy the results, I have not appeared as presuming to pose as a teacher. I have spoken of these subjects because the lectures alluded to will describe and explain in popular terms the state of science in the present day, and it was

thought that a general review of what has been done in certain branches of science since the beginning of the century might form a fitting prelude to those discourses. It is also hoped that a consideration of the benefits we derive from modern science may arouse a desire to refresh our memories or to learn more about the common things of every day life. It may be said and—without giving offence—that there is often want of information about such common things. There are for instance people whom we consider educated people—who do not know the principles, the “why and the wherefore” of the telegraph or the telephone they frequently use; who know little if anything of the structure of the trees and plants they see every day, and probably less of the wonders of the animal world in its various forms, and to whom the origin, composition and properties of many of the things they meet with in their daily work or business are unknown.

Probably information has never been sought on these subjects because the things themselves are so common; but if a desire for instruction in these respects does arise we may be sure that such enquiry and the knowledge thereby gained will bring great advantages. The agriculturist who learns all about the soil he tills and the plants he grows and as far as he can the ways of nature must be superior to him who works by mere rule of thumb; the artizan who is acquainted with the origin and structure of the materials he works upon, the tools he handles, and the laws which govern the process he employs will be a more valuable workman than one who knows nothing of these things, and so with every other worker. To the salesman in a store who takes

an interest in the origin, construction, and preparation of the articles he deals in, an otherwise monotonous and scarcely interesting occupation becomes enlivened and lightened. Even an increased aptitude for observation is valuable. The instances where intelligent observation has led to success in business and wealth are numberless, such as those of the man who from watching his wife's fingers as she made lace thought out the lace machine, and of the traveller, who examining the stuff of which a ship's fenders were composed, laid the foundation of the jute trade and his own fortune.

Even the *history* of Science is a fascinating subject. There are few more interesting occupations than following the growth from small beginnings of the knowledge of to-day ; to read of the difficulties, the active opposition, the disappointments, the triumphs which have been the lot of enquirers in all ages.

Again those lectures will have another aim. In this community the means of wholesome recreation are restricted. Public entertainments are few and infrequent, and from one cause or another younger members of society have difficulty in employing their leisure hours as profitably and as rationally as can be done at home. To these, scientific study would be a great boon. I do not mean that complete or even extensive knowledge of any one science is possible to all, but it *is* possible to acquire so much of the principles of Science as to make its pursuit interesting. No occupation can afford more legitimate recreation—none can be more serviceable in filling those crevices of leisure time through which evil creeps to mar and destroy. Scientific pursuits, however humble in aim and however simple, con-

stitute a link of union between all classes. We all have heard of the Republic of letters—of Literature. There is also a Republic of Science, where all men are on an equality, where distinction can only be won by industry and genius.

If it be said by any one “we work enough all day—it is not possible to go in for dry science,” one need only recall some of the many instances in which scientific studies have been pursued to great results under very adverse, difficult circumstances. From the lives of FERGUSON, the Shepherd Astronomer, HUGH MILLER, the Geologist, DAVY the inventor of the Safety Lamp, and a host of others we may learn how in the intervals of a daily struggle for bare existence, it is possible to study and to reap largely of the harvest of scientific knowledge. In such cases there was of course great love of science to induce such intense application and self-denial, and although we may hardly expect these examples to be often followed to the same extent, still they are an answer to those who say that to a hard worked man study is impossible; and they should be an encouragement to those of our young men who are striving for some healthful employment of their time, some way of relief from the tedium of unemployed hours, or of escape from temptation to employ those hours unworthily and worse than unprofitably.

I have disclaimed any desire to appear before you as a teacher. I am unhappily as unfitted for the rôle of preacher, but I may be pardoned if I remind you that as all knowledge comes from Him who made the world and all that therein is, so a reverent and humble study of science will teach us much of the wonders of His power

and His goodness. I say reverent and humble study, because while the great NEWTON said he was like a child gathering pebbles on the shore of the great ocean of knowledge, we have now-a-days very small NEWTONS who, like the fool mentioned in Scripture, say there is no God, and who boldly wading into that same ocean, get out of their depth and perish.

As we are honoured this evening with the presence of ladies, let me not omit to remind you that in the list of scientific workers and writers there are the names of many illustrious women. Without mentioning others, I may tell any ladies present who are given to shriek at a spider, or who believe the insides of all caterpillars to be a mere confused squash that in past days by Mdle. JURINE and in our own time by Miss ORMEROD large additions have been made to knowledge of insects and insect life. To the last named lady this society and the colony were indebted if I recollect rightly, for valuable information as to one or more of our insect pests. But I believe we have among us, if only a few, still one or two lady naturalists—may their example be followed.

It was with a view of kindling a desire for scientific knowledge, of imparting information and of affording means of rational recreation that these lectures were suggested. We have in the colony fortunately a number of gentlemen who are well qualified to instruct and entertain us, and the directors have received promises of help from some of these, and look for the co-operation of others. We hope to obtain one or more lectures from Mr. JENMAN, whose researches in the Flora of the colony have been attended with such success; Mr. FRANCIS, the Government Chemist, whose contri-

butions to the Society's journal are so valuable ; Mr. VYLE, the Electrician ; our Honorary Secretary, Mr. LUKE HILL, and other Civil Engineers ; Mr. QUELCH, from whose extensive and intimate knowledge of natural history, members of this Society and the public generally have derived much instruction ; Mr. DARNELL DAVIS and Mr. RODWAY will no doubt give us the benefit of their large acquaintance with general literature and the history of this and other colonies ; and from you, Mr. President, I trust we shall be favoured with some description of the distant and divers lands you have visited, and of their people and their industries ; and there are, it is hoped, many others who will cordially help in this venture.

At all events—whether successful or no—the Society in this endeavour to popularize Science is only carrying out one of the objects—the chief object for which it was instituted, and that is the advancement of the Agricultural and Commercial interests of the colony. These interests are so bound up with, so dependent on Science, that every advance in scientific knowledge must beneficially affect them. But the Society can only do *their* part. It is for *members* to shew their appreciation of these motives and these efforts, and to encourage the prosecution of the experiment by their frequent attendance. They will be more inclined to do this when I assure them that *after this one*, the lectures will *really* be worth listening to.

I have only now to thank you for your attendance this evening, and for the patience with which you have heard me.

Occasional Notes.

Minerals from California.—Well-deserving of inspection, in a new case in the Museum, is to be seen a varied collection of minerals received from the State Mining Bureau of California in exchange for samples of colonial woods. Among them are ores of gold, silver, copper, lead, tin, quicksilver, antimony, nickel, cobalt, chromium, manganese, etc. A model of the gold nugget, found in 1848 at SUTTER'S Saw Mills, which caused the rush to the Californian gold fields, is shewn, together with a large assortment of specimens of gold-quartz, which have all been obtained, as in the case of the other minerals generally, from mines which are either paying or have paid well. With the exception of one small specimen of Calaverite or Telluride of gold, the auriferous ores shew no free gold, though they abound in the glitter of the "sulphurets" of iron, copper etc., often mistaken by the inexperienced eye for the flash of the more precious metal. In these specimens of auriferous quartz, the gold is so intimately associated with the "sulphurets," that a process other than amalgamation with mercury is required to extract it—a process known as *chlorination*, already described on p. 46. Illustrative of two steps in this process, samples are included of auriferous ore yielding \$100 per ton, after it has been crushed to a fine powder by the "stamper," and after it has been roasted previous to its being moistened and treated with chlorine gas. A very interesting addition to the series of gold ores, is present in the form of "country rocks" and "wall rocks"—the former being the characteristic rocks

of the country in the neighbourhood of gold deposits, and the latter the rocks directly in contact with the auriferous veins. Among the silver ores, many of which are also rich in gold, is a specimen of *silver sandstone* from Utah—an ore which when first discovered was pronounced to be a fraud by experts, who evidently regarded it as common sandstone soaked in a silver solution, but from which, however, it appears that millions of dollars have since been paid as dividends. In addition to the ordinary metallic ores, are to be seen various minerals of economic importance, such as specimens of gypsum and phosphorite, used as fertilisers and for other purposes; of asphaltum and bituminous sand, used for roadways, sidewalks and roofings, etc., and of *Wollogongite* or Australian coal, used (mixed with ordinary coal) in the gas works to enrich the ordinary gas.

Interesting specimens are also shewn of diamondiferous sand, and of *Itacolumnite*, the associate rock of diamonds; of graphite, which in California, however, is not of the first quality; of arragonite, so largely used for ornamental work, and of *dendrites* on country rock, which on this, as on other rocks such as granite, slate, etc., of which specimens are shewn from British Guiana and from Wales, are due to the presence of manganese under the form of sea-weed-like tufts.

Change of plumage in Birds.—Among the most interesting features of bird-life must be ranked the very marked changes of plumage undergone by some, perhaps the most strikingly coloured birds, while passing from their immature to their adult condition: and though the

most typical examples of this met with in the colony are well-known, a reference to some of them might not be out of place, considering that at any rate they are not commonly known. Most residents are more or less familiar with such birds as the snowy bell-bird, the richly-coloured cock of the rock, and the equally striking cotingas, but these birds are known simply in their adult male plumage, the females and the young males being so differently coloured from their fully developed sire that, at first sight and merely from appearance, it would be concluded that no relationship existed between them. Recently the Museum collection has been enriched by the acquisition of series of specimens of several species which well illustrate these changes, and it is hoped that soon they will be available for inspection in the public exhibition cases.

The campanero or snowy bell-bird presents one of the most marked examples. Here, as in the other birds generally, the colouring of the young males even when equal in size to the full grown bird, is so similar to that of the uniformly-coloured females, that it would be impossible to distinguish the one from the other, were it not that the young males possess the distensible appendage by means of which the bell-note is rung—an appendage confined entirely to the male sex. In the females throughout life, and in the young males, the colour is a lively though pale green, touched with white, in powerful contrast with the pure milk-white of the adult males; and every variety between the two extremes of male colouring is obtainable as the greenish tint gives place gradually to the eventual white.

In other birds such as the cotingas, in which there are

no external sexual characters, other than those of plumage, the young males cannot be distinguished from the females. In all these birds, a greyish or brownish slate colour predominates under these conditions, and the differences between the two sexes become apparent by the development of spots of colour on the feathers of the young males initiating the final blaze of plumage of the adult birds. From the dull slate colour, the pompador cotinga passes to its gorgeous purple body, with white wings; the purple-breasted cotinga to its deep blue body with purple breast; and the purple-throated cotinga to its lovely pale-blue body with the purple brooch upon its throat.

Numerous other instances such as the scarlet ibis, the cock-of-the-rock, etc., might be mentioned; but the above will serve to direct attention to this remarkable condition in nature, where the primal inconspicuous covering of birds has, in the male sex, been gradually exchanged for a brilliant and conspicuous garment, the better to fit them as centres of attraction for their dowdy mates.

*Fossilized Conch Shells.**—These fragments of fossilized shells (*Strombus gigas*), were found strewn about

* The fossils here referred to consist of some interesting fragments presented to the Museum by Mr. Nind, and exhibited with an ordinary so-called *shell-chisel*, lent by him. The *chisel* is evidently man's work; and the fossil fragments appear to be the rough material from which the finished chisels were prepared. It seems almost certain that the thick parts of the *fossil* shells were used for this purpose. References bearing directly on this point will be found on pp. 737 and 739, Smithsonian Report, 1884, in a most valuable and interesting paper by Mr. Otis T. Mason on the Guesde collection of antiquities made at Point-à-Pitre, Guadeloupe.—J. J. Q.

a raised sea beach in a small secluded bay near Fowl Bay on the windward coast of Barbados. At this spot there are four well defined beaches in the face of the cliff which is here 30 to 40 feet in height and appears to be a hard volcanic rock.

The upper beach exhibits a good many broken pieces of shell and some few lie scattered on the beach, next below the top one. As the conch shell only occurs at the present day in comparatively deep water, these fragments point to the presence of man, at a remote period, who may have collected conch shells from the neighbouring depths by diving, and have here established a manufactory of the tools he used—the rude imperfect pieces representing the chips and failures of the workmen engaged in this primitive handicraft. Or it may be that some Caribs at a later date here discovered a store of fossilized conch shells and manufactured the celts which are not uncommonly found in Barbados fashioned from the same material; and the smaller pieces would still represent the chips and broken specimens that must have abounded where the substance worked was so brittle as conch shells in a fossilized condition.

Some persons may be incredulous as to these fragments having been intentionally wrought into their present forms, regarding them simply as the result of accident—pieces detached from the matrix shell by the action of the waves on the shore and assuming shapes strongly suggestive of the hand of the designer.

It may be remembered by those for whom pre-historic archæology has an interest, that the first discoveries of flint implements made by M. BOUCHER DE PERTHES in the drift gravels of the Somme were termed *langues des*

chats, owing to their shape and resemblance to a cat's tongue, and many men with true scientific caution for long considered them as the outcome of natural forces rather than the sure indications of man's presence at so remote a period as their position indicated.—*P. H. Nind*.

Colour-protection.—Of all nature's freaks there is perhaps none more interesting than what is known as "Colour-protection." It has long attracted the notice of naturalists all over the world, and each day new and instructive examples are being brought to light. Among the most remarkable instances that have yet been recorded, may be mentioned the different species of Leaf Insects which so closely resemble, even in the minutest detail, withered Autumn leaves. Having lately had occasion to ramble much about the forests of this colony, I have had ample opportunity afforded me of indulging in my favourite study of Natural History, and for the benefit of those who may be interested in subjects of the sort, I have thought to record a few curious examples of colour-protection met with in my peregrinations. The strangest of these was a little caterpillar about a quarter of an inch in length and not thicker round than a No. 10 thread. This little creature bore so close a resemblance to a small fungus, commonly found growing on the dead leaves about the forest floor, as to render it almost impossible to distinguish it from a vegetable growth; it would hold with its anal feet to the stem of a dried leaf keeping its body erect, and at the same time bending a tiny white head between two pairs of feet placed close under its mandibles or jaws, and in this

position could not be distinguished from the small fungi that grew on the same stem. I kept the little fellow some days in a percussion cap box, but he at last succeeded in making his escape. Specimens of a grasshopper were also met with that on first inspection might have been mistaken for dried twigs. A beetle scarcely larger than an English pea, had the appearance of only half an insect, the elytra or wing cases projecting a considerable distance beyond the abdomen which appeared to have been cut off; it also possessed the power of feigning death, and when in this state, looked more like the head and thorax of a beetle than a perfect insect; to render the deception more complete it was semi-transparent, and may have passed as the dried remains of an insect that had fallen a prey to some cunning spider. Other two examples were frogs, the back of one being a perfect representation of a skeleton leaf in which every vein could be distinctly seen, the mid-rib of the leaf being represented by a raised vein, which, running along the back of the frog, terminated in a short rudimentary tail, and took the place of a foot-stalk. The other specimen was of a dirty white colour with green spots on the joints of its legs curiously resembling moss, so that when the animal remained quiet the likeness it presented to a piece of quartz that had been discoloured by exposure to the atmosphere was truly remarkable, in fact few would have taken it for a living creature at all. I may add that it was found on the banks of a creek where fragments of quartz lay scattered about in profusion, and it would seem that this protective colouring was given to the species to prevent its utter annihilation by snakes which were most numerous

in the bushes around, 6 or 8 having been killed in the course of an afternoon by our men. It is a well known fact that were it not for the aid of Colour-protection whole races of insects would be doomed to extinction, which would of course mean so many interesting pages torn from nature's instructive volume.—C. A. Lloyd.

The Rice Industry on the North Coast, Essequibo.—The constant rains that have fallen since the beginning of this year have caused an unusual demand for field labourers on the cane fields. The rise in the sugar market in the end of last year, and the satisfactory progress of the Bounties Conference giving better prospects for the future, have encouraged the sugar planters to increase their cultivation. This is the proper season for planting new cane land, and a great deal of it is being done on this Coast. With fair wages obtainable and paid weekly with the greatest regularity by the sugar planters, it is not to be wondered at that many labourers prefer working in the cane fields to waiting three months for the result of their own labour in the Rice fields. Still the Rice Industry on this Coast has quite held its own in the last six months. At *Coffee Grove* I am told that 120 acres are now in Rice cultivation, and on *Anna Regina* there is just about the same. I have had, and am still having, applications for more land, but I discourage the people from spreading over too much ground. They are inclined to cultivate more than they can manage comfortably, and in consequence, there are frequently abandoned spots which we find very harmful in harbouring rats. These terrors of the

Rice farmers made their appearance here again a few months ago. Half a dozen mongoose were released in the plots where there were most signs of rats, and there are now very few signs of them. I may mention incidentally that six months ago we had a plague of rats on this estate. In the cane fields they were killed by thousands by rat-catchers' dogs. The Hospital was almost taken over at night by enormous field rats. One night a sea punt moored in a trench near the Factory was boarded by them and some of the sails cut to pieces by them.

As they appeared in great numbers first in the Rice fields, I fear they were attracted to the estate by that cultivation and that it favoured their propagation. About two dozen mongoose were brought from Barbados and let loose in different parts of the estate. The result has been very satisfactory to me as manager of the estate, but the poor rat-catchers have been done out of a living.

Rice paddy is selling here at present at six to seven shillings per bag of 100 lbs. It is very difficult to get clean rice to buy as the weather is so unfavourable for sunning the paddy. The nominal price of well cleaned rice is a shilling a gallon, but it is necessary to offer more if any quantity is desired. I have had careful experiments made in cleaning rice and find that two strong men and a child can turn out a bag of 160 lbs. of clean rice from 2 bags of 100 lbs. each of paddy in twelve hours. The cost of this labour is about five shillings. It is hard work for the three people and the mortar used must be a good one to enable them to do the work in the time I name.—*A. R. Gilsean.*

IN MEMORIAM: *William Russell.*

Died Wednesday, March 28th, 1888: Aged 61.

(See Minutes of the April Meeting of the Society.)

Report of the Meetings of the Society.

Meeting held on 12th January.—Mr. G. H. Hawtayne, C.M.G., Vice-President, in the chair.

There were 15 members present.

Elections.—*Associates* : Allen Bravo Allt, Benj. H. Whittaker, Edward Badley, and Chas. Jos. Godfrey.

The Secretary read a letter from Mr. W. Russell, referring to Mr. Minty's experiments in Rice cultivation.

The Secretary referring to the Circular from the London Chamber of Commerce, said that there was now a Bill before the Legislature relating to Fraudulent Trade Marks.

The Chairman mentioned that Mr. Rodway had been engaged as Librarian and Assistant Secretary. The Rev. J. Foreman remarked that he understood that the selection was to have been submitted to the present Meeting, to which the Chairman replied that as the appointment was altered from Secretary to Assistant Secretary, no change in the Bye-Laws was necessary.

The Treasurer submitted the Annual Statement of the Accounts of the Society which had been duly audited by Messrs. D. C. Cameron and M. Garnett, and also an analysis of the same, showing the Financial position of the Society. He then proceeded to call attention to the large amount due to the Society from Members who did not pay their Subscriptions, and to the necessity of enforcing the Rules that Members who were in arrears should have their names struck off. During the last year, 63 names of members and associates had been struck off the Roll for non-payment of their Subscrip-

tions. Deducting those struck off, the Membership Roll now stood as follows :—

Ordinary Members	154
Country Members	53
Associates	123
Lady Members	4

— Total 334.

During this year he intended to adhere strictly to the rules of the Society relating to the erasing names of Members in arrear. If the Members would pay their Subscriptions regularly the Revenue would cover the Expenditure, but if such should not be the case they would have to fall back on the accumulated surplus of many years. He did not think the Society so “Disgustingly Rich” as was stated some time ago, and if the surplus fund should be touched at all it should be for the improvement of the premises. He then proposed that the Report and accounts be adopted, which was seconded by Mr. J. S. Hill.

Rev. J. Foreman asked whether the vote of \$2,000 to the Agricultural Committee still stood ?

The Treasurer replied that as it had not been drawn he considered it to have lapsed, and had included it in his surplus.

Rev. J. Foreman said that the money having been placed at the disposal of the Agricultural Committee by resolution, must remain at their disposal until that resolution is rescinded.

The Treasurer in reply to a question of Mr. N. D. Davis said that the Subscriptions received in 1887 were \$900, less than in 1886.

Mr. N. D. Davis suggested that the Arrears of Sub-

scriptions should be put into a Lawyer's hands for collection, to which the Treasurer replied that he had a semi-official legal opinion that as the Society had not carried out its Rules as to expunging Members at the proper time, they had no legal remedy against defaulters. In future, however, as the Rules would be enforced strictly, there would not be the same difficulty.

The Treasurer's report was adopted, the Chairman remarking that great credit was due to Mr. Conyers for its accuracy and the way in which he had placed the position of the Society before its Members.

The List of Members in arrears was ordered to be posted in the Reading Room.

The Secretary read a letter from Mr. J. J. Quelch, Curator of the Museum (who was unable to attend through ill-health) describing a specimen of auriferous gravel which was laid on the table. It had been obtained from the Puruni River and presented to the Museum by Mr. George Garnett.

The Rev. J. Foreman moved the resolution of which he had given notice at the previous Meeting that "*the Directors be requested to add as much as they possibly could to the \$2,000 already placed to the credit of the Agricultural Committee.*" He said, that the amount already given was quite insufficient for any practical purpose, and that there was a feeling among the Country Members that the Society should be more worthy of the name "Agricultural."

Mr. Gillespie seconded the motion.

The Treasurer opposed; he considered that the Society was not in a position to spend money on Agricultural experiments.

After a few remarks from the Chairman the motion was put to the vote and lost.

The Treasurer gave notice of the following motion :—

That the amount of \$2,000, voted last year for Agricultural experiments, not having been used, the vote shall lapse.

The Rev. J. Foreman gave notice of the following motion :—

That the balance on hand at the end of the years 1885, '86, '87, be laid on the table.

Mr. T. Daly gave notice of the following motion :—

That application be made to the Government for the sum of \$2,000, for Exhibition purposes, and that \$1,000 be placed at the disposal of the Committee of Correspondence, for the purpose of holding Local Exhibitions on the East & West Coasts of Demerara.

Mr. N. D. Davis gave notice of the following motion :—

To move at the General Meeting in April next that provisions be made in the Society's Bye-Laws for the Annual Election of a Commercial Committee.

The Chairman referred to the letter of the Government Secretary in reply to the request of the Society for specimens of woods, &c., to be supplied to the Society through the medium of the Government Botanist. He thought that as the specimens were for the Museum, the expenses of collection should be borne by the Government.

The Secretary was directed to communicate to the Government Secretary; requesting that the Government Botanist be asked to procure specimens of Forest Trees as occasion offers.

The following Paper by Mr. W. P. Abell on the "Causes of Boiler Explosions" was taken as read :—

In my last paper on boilers, I proposed reading a few notes on their seating; but in putting these together it struck me as more appropriate to pass a few remarks on the worst effects of seatings, viz.—explosions,

and thus have a clearer understanding of the condition to be fulfilled by the seatings. From a consideration of the statistics of boiler explosions that have taken place of recent years it will be seen that the four principal causes from which boilers give way, and the proportion of these causes of failures, are 1st. 49 per cent. to defective condition ; 2nd. 18 per cent. to shortness of water, about 10 per cent. of these have defective fusible plugs ; 3rd. 25 per cent. to malconstruction ; and 4th, 8 per cent. from excessive pressure. Defective condition embraces corrosion in various forms ; due to chemical action when ordinary rust is formed ; to galvanic action when the stay heads are eaten out, or when pit holes are formed in the tubes, or plates ; it is mechanical action when grooves are formed by the alternate bulging, and straining, assisted by any acidity that may be present in the water, this may be introduced with the condensed water from the engine cylinders, or the overflow from the vacuum pumps mixing with the trench water with what the boilers are fed, especially when this water is nearly stagnant bush water. Sweets finding their way into feed water, although this has an anti-scaling effect in cases using feed water impregnated with lime, it is not to be tolerated in Demerara where our water is free from lime. Stagnant bush water particularly when mixed with sea water is disastrously active on either iron or steel. Fortunately some of their chemical actions can be counteracted by the use of neutralising agents as it is never of such a form, and appearance, to escape the notice of the experienced eye, although the plates are sometimes so generally and evenly wasted as to escape the notice of an unskilled, or indifferent attendant. Boilers standing and not working should be cleaned out, and filled with pure water containing a good amount of soda dissolved in it.

Some few months since I had occasion to condemn a boiler rendered dangerous through this even corrosion, indeed so even that when the boiler was rolled out of its seating to an ordinary eye it seemed perfect but a few blows with the hand-hammer revealed the fact that corrosion over the bottom had reduced the plates from half an inch to an eighth, and in some places only a sixteenth ; it was the seam that particularly told an unmistakable tale ; this peculiar corrosion is generally found to be most severe on heat giving surfaces, such as bottoms of externally fired boilers and furnaces of internally fired boiler. It is often caused by a peculiar class of mine water, and by most of our peaty waters here, both of which sometimes contain free oxygen, which attacks the plates readily. This particular feed

water is generally so pure that little or no sediment is seen. As a preventative against the ravages of this enemy a few days feed from water charged with calcium sulphate will give a coating of scale which will for a time protect the plates, this coating been renewed as required. It will therefore be seen that the non mineral feed water in this colony is not always an unmixed blessing. Whenever this peculiar corrosion is seen the only way to gauge depth, and extent, is by the use of either the hammer, or drill, as other modes of gauging and sounding are often misleading.

Corrosion is also seen in a commoner, but perhaps not so formidable a type being generally found in fittings, and scattered patches over different parts of the boiler in which it is much more conspicuous, and has a more dangerous appearance, consequently it has a greater tendency to intimidate owners into having it attended to, the somewhat erratic forms taken by this particular corrosion are very difficult to account for.

It is occasionally found deepest in the coldest plate, which leads us to think it is the cold plates, such as shell bottom plates immediately over seating blocks, and other cold places where the corrosion is effected, it also invariably attacks the back end plates of multitubular boilers just above water line and at the tube ends particularly at the front, but sometimes at the back of the boiler, but seldom both ends in the same boiler.

In other cases it will be found to most seriously affect the heat giving surfaces; the most conspicuous case of this I ever met with was on L'Union estate, where the intensity of the fire, direction of the draught, and the position of the fire bridge, could readily be determined from the water side of the flue; the corrosion in this case also attacked the tops of the galloway tubes. I may mention that the flues of this boiler had no provision for expansion, consequently the mechanical action formed grooves, and cracks, some 3 feet in length, and for the whole depth of the angle iron connecting the two tubes to the boiler end. It is fortunate, however, that wherever these active corrosive agents are at work their mischievous results are easily detected, for where corrosion is very active there will be no hard tenacious scale to conceal it, from the simple fact that so long as the iron is being oxidised, or dissolved as it were, the sediment will shell off with the oxide.

Leaving internal corrosion, we meet with a worse enemy in the form of an external corrosion set up by dampness in the flues due to leakage

or any other causes. This is often aggravated and concealed by the brick work of boilers improperly seated, such as inaccessible flues, broad seatings &c., this latter is perhaps responsible for more expensive repairs, annoying stoppages, and disastrous explosions, than any other defect, although it is not one of the most difficulty to discover when boilers are properly seated; the effect of this bad style of seating is invariably aggravated by being faced with lime, instead of mud, or fire-clay. I met with a most interesting example of this kind of corrosion on a multitubular boiler at Columbia, which, if properly seated would doubtless have been in good condition whereas from the forementioned defects the plates along the side flue seating cover, and round the front wall were reduced in thickness from about $\frac{1}{2}$ an inch to an $\frac{1}{8}$ and in many cases less the $\frac{1}{8}$ of an inch thick by corrosion which was never noticed, indeed it scarcely could be noticed when the flues were so small that they could not be entered, and could only be cleaned by using a long rake; otherwise the boiler was in such good condition, and of such splendid material, that the \$300 spent in rectifying the mischief done has proved to be money well invested.

External corrosion is often rapid but rarely so rapid as to become dangerous in twelve months.

It is more or less severe according to the conditions it is working under; for instance, if there be a leakage in a seam where the seatings are broad, and where the plates are continually moist, oxidation goes on very rapidly, particularly if the fuel gives off sulphurous fumes, or other acid gases which may become condensed, and so increase the corrosive action going on.

Dampness in flues may be due to many other causes than leakage not attended to; natural dampness in foundations; the flues being lower than the surrounding yard floor; flues not being drained, and other causes; not the least of which is the condensation of the steam given off by the green megass: indeed this latter cause has been found to give rise to corrosion on what were looked upon as perfectly dry seatings with no trace of leakage. Fortunately this corrosion is most conspicuous in low pressure boilers, whose temperature is little above that of 220 degrees F., whereas the freedom of high pressure boilers from this oxidation may be attributed to the fact of their higher temperature; this also is one of the many reasons why a boiler should not be emptied whilst under pressure, but allowed to cool down, to a few pounds steam pressure, thus materially helping to evaporate the damp collected, and absorbed

by the walls, and at the same time creating the necessary chimney draught to take away as much as possible, the sulphurous acid gas often so unadvisably delivered into the boiler chimney, and that often only a few feet above the boiler flues, or into the main, and by this means transforming a new boiler into an old one in a remarkably short space of time, the weight of this gas, as it leaves the sulphur-box and its active chemical action on iron, and steel, is so well known to us all that the bad effects of its subtilely entering our boiler flues needs no further comment

A most dangerous external corrosion takes place on boilers through their being covered with lagging which rarely, or never gets removed or that will not indicate a leak. If external corrosion has to be remedied the first cause must be dealt with direct, and removed if possible; as there are no means of introducing an antidote for neutralising the effect. I do not know of a more unsuitable boiler lagging than the bricks and ashes so often met with both here and in England, especially when the filling up is done with ashes which on the least introduction of moisture give out most active corrosive gas, all samples of the corrosion. The conditions to be filled by lagging for boilers are not only that they be good nonconductors to keep in the heat but that they be of such a substance as to peel off, or otherwise indicate, a leakage, taking place under it; of this and its effects I may possibly with your permission have something more to say at a future date.

I bring before you another example which can be examined on almost any estate. It is the effect of moist ashes raked out, and slacked in contact. Where this is practised it is no uncommon thing to see a boiler front which was originally three-quarters thick, reduced to half an inch, and some places less than three-eighths,—this always necessitates repairs, seldom costing less than \$200 to \$300, besides materially affecting the life of a boiler, and in some cases through the water getting down into the blow-off pipe, and corroding it to such an extent as to cause a leakage, and thus unexpectedly run the boiler short of water at the expense of the estate, and the undeserved discredit of the boiler feeder. Discussion postponed till next meeting.

A letter from Mr. T. C. Duggin of Berbice, in which was enclosed a Chart of the Upper Berbice River, was read. The Chart being offered for sale, the Secretary was directed to write and ask the owner to state its price.

A vote of thanks was accorded to Mr. Rodway for a copy of the "Linnean Transactions" containing a Report on the Botany of Mr. im Thurn's Roraima Expedition.

The President called the attention of the Secretary to the fact that a Vote of Thanks passed at the previous Meeting to "the President and Officers of the Society for their services during the previous year" had been omitted from the Minutes.

The Meeting then terminated.

*The Royal Agricultural and Commercial Society of
British Guiana.*

ANALYSIS OF SOCIETY'S FUNDS TO 31ST DECR. 1887.

Cash in British Guiana Bank	...	...	...\$	2,452 12
Hand-in-Hand Scrip, Face value	...	...	...	2,199 09
Amount at Credit of the Society with London Bankers				517 90
Rents due to 31st Decr., 1887	585 00

5,754 11

Less due Sundries to 31st Decr. '87, per Balance

Sheet	280 63
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\$ 5,473 48

The Royal Agricultural & Commercial Society of British Guiana.

RECEIPTS AND EXPENDITURE FOR THE YEAR 1887.

RECEIPTS.		EXPENDITURE.	
To Society's Funds 31st Decr. 1886	\$ 7,087 25	By Salaries and Clerical Assistance to Hon. Secretary and Hon. Treasurer ...	2,098 00
" Subscriptions—		" Periodicals, Magazines, Newspapers, Advertising, &c. ...	1,347 90
Ordinary Members ...	1,470 00	" New Books added to Library ...	674 04
Country Members ...	438 00	" Cost of <i>Timetri</i> , old issue ...	766 85
Associates ...	641 50	" Do. do. new issue, 30/6/87 ...	138 70
Lady Subscribers ...	15 00	" Mr. Rodway re arranging Library and preparing New Catalogue ...	500 00
Arrear Subscriptions ...	2,564 50	" New Shelving ...	382 25
" Rents ...	220 00	" Insurances with Hand-in-Hand Insurance Company ...	437 50
" Catalogues ...	2,340 00	" Repairs to Buildings and Pavements ...	384 72
" Interest \$120.28 and Profits \$194.39 from Hand-in-Hand Insurance Co. ...	314 67	" Contribution to Permanent Memorial Fund in honour of Queen's Jubilee ...	100 00
" Scrip from Hand-in-Hand Insurance Company ...	194 39	" Gas in Rooms \$78.45, Illuminations Jubilee \$67.72 ...	146 17
		" Pedestals &c. for Blair and Campbell busts ...	46 12
		" Freight, Postages, Reading Room and Petty Expenses ...	232 04
		" Society's Funds per Balance Sheet ...	7,248 29
			5,473 48
			<u>\$ 12,721 77</u>
			<u>\$ 12,721 77</u>

Meeting held on 12th February.—Mr. G. H. Hawtayne, C.M.G., Vice-President, in the chair.

There were 13 members present.

Elections.—*Members*: Rev. W. B. Ritchie, S. Vyle.

Associate: H. S. Davis.

The Chairman informed the Meeting that a Deputation from the Society had waited upon the Governor to ask him to become the Vice-Patron of the Society. His Excellency had kindly consented to take that Office, and informed the Deputation that he would take great pleasure in doing everything he could to advance the interest and prosperity of the institution.

The Chairman referred to the letter of Messrs. A. Rimmer & Co., who had applied for information as to Port Charges of Georgetown, &c, and informed the Meeting that the Committee of Correspondence had prepared the answers to their request which would be forwarded by the Secretary of that Committee.

The Secretary stated that he had received a letter from the Rev. J. Foreman, excusing himself from attendance at the present Meeting through illness, and asking that the motion standing in his name, "that the balances on hand at the end of the years 1885, '86, and '87, be laid on the table," should be allowed to stand over until the next Meeting.

The Treasurer said that as he had prepared the information as far as the books would allow, he would lay over the statement at once. As the Society had only a Cash Book in 1885 he had only been able to get an approximate estimate of the Nett Funds at the end of the year 1885. With this proviso the amounts were as follows:

Available Funds, Dec. 31st, 1885—\$4,276 76.

Ditto " " " 1886—\$7,087 25.

Ditto " " " 1887—\$5,473 48.

In the absence of the Rev. J. Foreman, the Treasurer asked the Meeting to allow him to postpone his motion "that the Vote of \$2,000 for Agricultural purposes be rescinded"

Mr. Thos. Daly moved the resolution, of which due notice had been given, "That application be made to the Government for the sum of \$2,000 for Exhibition purposes, &c." He said, that the last Exhibition had been held in Georgetown in 1885, and as the Government vote of \$1,000 per annum had not been used, this sum might be obtained for the purpose of holding Exhibitions on the East and West Coasts, and perhaps, if the funds would allow, in Essequibo and Berbice. His idea was, that prizes should be offered for the best and cleanest house, the best kept field, the neatest surroundings of a house, the finest samples of provisions, and live stock, &c.

Mr. F. A. R. Winter seconded the motion, believing the object to be very desirable. He stated that the Government vote having been allowed to lapse during the last three years, they might not object to hand over the whole sum of \$2,000 in one vote.

Mr. D. C. Cameron spoke in support of the motion, he considered it a step in the right direction, and had no doubt that it would be productive of much good if it could be carried out practically.

The Chairman thought that great benefit would be derived if the people could be induced to make their homes more comfortable. There was no doubt that

the surroundings of the homes of the poorer people of the colony were very bad, and the inhabitants did not seem to see the necessity of cleanliness and decency. In London, a great deal of good had been done during the last few years by offering prizes for Window Gardening. The care of flowers had given the artisan and mechanic an interest in his home when he returned from his work. It would be a very good thing if the offering of Prizes should induce the people of the colony to show off to better advantage.

Mr. N. D. Davis said that unless the Society held an Exhibition somewhere in the colony, it would lose the advantage of the annual vote for Exhibition purposes. The Exhibitions in Georgetown only gave the inhabitants a few days pleasant outing, but if it were wished to educate the humbler classes especially, the exhibitions should be brought within their reach. He also suggested that Prizes should be given to the family who did most work and earned most money in a given time, as Mr. Gilzean and others had already done.

Mr. R. P. Drysdale said he was prepared to support the motion, but the Society must understand that the vote of the Combined Court having been allowed to lapse, an application for a new grant would be necessary. This could not be made before the meeting of the next Combined Court, but he had no reason to doubt that it would be given, and in the meantime the Society might give their attention to the practical details of the matter.

After several remarks from the Chairman, the motion was altered by consent of the meeting to the following :—

That the Secretary of the Society be authorized to request the Government,—the votes for Exhibition purposes for the years 1886-7-8, not

having been given,—that the sum of \$3,000 be placed on the Supplementary Estimates for the purpose of holding Exhibitions in the Country Districts

The amended motion having been duly seconded by Mr. F. A. R. Winter it was put to the vote, and carried unanimously.

The Secretary read a letter from Mr. T. C. Duggin, offering to sell the Chart of the Upper Berbice River, which had been exhibited at the previous meeting, for the sum of \$100. For the purpose of encouraging researches of this kind the Secretary moved that the sum of \$25 be offered, but the motion not being seconded, he was ordered to return the chart to its owner.

The Secretary read a letter from Mr. W. Walker in which the balance to the credit of the Society was shown to amount to £86 14s. 11d., and asking for a remittance of £50 or £60. Mr. Walker was glad to notice that attention was being directed to the development of the Fruit Trade in this colony.

The Secretary read a letter from the Government Secretary referring to a set of J. C. Brown's works on Forestry which had been presented to the Government, and forwarded by it to the Society. The Secretary was directed to forward the thanks of the Society to the Government Secretary for the present.

A second letter from the Government Secretary was read acquainting the Society that the case containing Lord Vernon's "Dante's Inferno" had arrived in the colony, and enclosing bill of costs for binding, freight, &c., amounting to £4 3s. 9d. The thanks of the Society were accorded for the donation. The Treasurer was directed to pay the account.

The thanks of the Society were tendered to Mr. J. Rodway for copies of Surveyor's Maps of the Coast Lines and Estates of the colony from the River Essequibo to the Berbice; and also to Mr. A. C. L. Campbell for a copy of the Society's Rules and Catalogue dated 1858.

The Secretary read a letter from Mr. W. P. Abell, referring to his paper on the "Causes of Boiler Explosions", and excusing his absence from the Meeting.

The paper having been printed in the newspapers of the colony was now brought up for discussion, but in the absence of the author the matter was postponed.

The Chairman recommended that it be sent to Mr. E. E. H. Francis, the Government Chemist that (as suggested by Mr. Abell) he might endeavour to find a remedy for the corrosion of Boilers by "Bush" waters.

The Chairman exhibited an Arrow Head, apparently made of rock crystal by chipping. He reported it as having been found at a depth of five feet in the soil of the Puruni river.

The Secretary moved that "as the experiment of opening the Reading Rooms on the two evenings after the arrival of the 'Mail' had been unsuccessful in attracting visitors, they be closed after the two evenings of the coming Mail" He reported that the average of attendance had only amounted to three persons on the evening after the arrival of the "Mail," and one on the following evening.

Mr. N. D. Davis seconded the motion, which was carried unanimously.

The Secretary announced that Mr. D. Skekel had

intimated his intention of reading a paper at the next Meeting on :—

An improved three-roller Sugar Mill,
illustrated by drawings and a working model.

The Meeting then terminated.



Meeting held on 8th March.—P. H. Nind, M.A., President, in the chair.

There were 21 members present.

Elections.—*Member* : Dr Texeira.

Associates : J. A. Main, H. S. Lansdell.

The President said that before proceeding with the ordinary business he wished to say a few words. Absence from the colony had prevented his attending the Meetings which followed the election of Officers, and this was the first opportunity he had had of tendering his thanks to the Society for the honour it had done him in electing him as President for the current year. He accepted the Office not as an honorary sinecure but as a position surrounded with great responsibilities. He considered that, although the duties of Officers were laid down in the Bye-Laws, these duties should not be read in the light of a generation and a half ago, nor twenty or even five years ago, but by the light of the present year 1888. It seemed to him that the founders of the Society had based it upon broad lines, and it was a happy thought of theirs to follow the progress of the colony at large, and not any dominant interest in it. In Section A of the Bye-Laws they had given agriculture the first place ; certainly

that was the dominant interest, but the founders had perhaps looked forward to a time when, although sugar would be the first among equals, it would not be more than that. They all knew that the sugar industry had been the mainstay of the colony, and as the Society represented the colony, it had been accustomed to choose as its President one of those who had a large stake in it and who belonged to its prominent class. Many of the Presidents taken from that class had been men of ability, and had thrown themselves into the work of the Society with energy and unsparing liberality, and he was sure the Society would never allow their names to be forgotten. But a change had come. The Society selected an Officer of the Government, a man of the world, a man of culture, of literary tastes, and one well known to take an interest in the Society. He referred to their late esteemed President, Mr. Kirke. This was a departure in a new direction, and it had a meaning apart from its popularity. The Society declined to be considered as merely the organ of one interest. It wished to be representative of the colony at large. He expected that in future the President would be selected for those qualities which had always been kept in view in the past, but entirely apart from any particular class. Of course it might be suggested by those who were biassed in their views in favour of the dominant interest, that the Society would be apt to neglect that interest. He had no fear of that whatever, sugar planting must be the leading industry for years and years, and there were those present who would be always ready to keep it before the Society. They had men of ability, engineers, chemists, and planters, who would never allow the Society to sink to the position

of a mere literary institute or circulating library. With its correspondents abroad, its museum here, and its local exhibitions to look after, he did not believe the Society was ever going to efface itself in this colony. Having been away from the colony he did not know what the Society had been doing lately until yesterday, when he was pleased to learn that Lord Gormanston had been asked to become Vice-Patron of the Society and glad to find that he had accepted the office. He would propose that some additions should be made to the premises of the Society and some deficiencies supplied; that some accommodation for ladies be provided, and some alterations made in the Rules to allow Lady Members to attend the Meetings. He would be glad to see this Society made a centre, from which might be established branches in the sister counties and in the villages. He noticed that Mr. DAVIS had proposed the election of a Commercial Committee, which he considered to be a very good idea on the whole only depending on business gentlemen to work it out. It would be in the memory of all that Mr. Hawtayne had carried a motion in favour of Lectures, which he hoped might be put in a workable form shortly. In these and other proposals which he intended to lay before them from time to time, he hoped to obtain their approval and co-operation.

The Rev. Canon Castell, through Mr. T. Daly, presented a flower spike of an Orchid and asked for its name if it could be identified. The Assistant Secretary recognised it as *Coryanthes macrantha*, and explained the wonderful contrivances by which it is fertilized. The President moved that a vote of thanks be given to

Canon Castell, which was carried, and remarked that he hoped the gift would stimulate others to forward objects of interests for exhibition at the Meetings.

The Secretary read a letter from Mr. Quelch, Secretary of the Committee of Correspondence, referring to the letter of Messrs. Rimmer & Co., and reporting the arrival of a fine collection of minerals from California in exchange for the woods sent by the Society.

The motion of the Treasurer which had been laid over from the previous Meeting, "That the amount of \$2,000 voted last year for Agricultural Experiments, not having been used, the vote shall lapse", was then brought up. In the absence of the Rev. J. Foreman, the Treasurer intimated his willingness to again postpone the matter to allow that gentleman to take part in the discussion, he having expressed himself adverse to the motion. It being the general feeling of the Meeting that the matter should be settled it was proceeded with. The Treasurer said that as the amount of \$2,000 was insufficient for any practical Agricultural Experiments it could be applied to better advantage in increasing the usefulness of the Museum and Library. Since the amount of the Subscriptions had been reduced the income of the Society would barely cover its expenditure. If they got rid of the \$5,000 accumulated in former years, they would be living from hand to mouth and have no funds to repair or paint the buildings, or make any improvements. The Agricultural Committee had said that the amount was inadequate, and that being the case, he would now move that the vote should lapse.

In seconding the motion Mr. S. Bellairs stated, that the amount being too small for any practical purpose, he

would support the motion, as he considered it was too large a sum to be wasted.

Mr. N. D. Davis in supporting the motion said that as there was no Bye-Law dealing with the case of a money vote being unused, he hoped the Society would follow the rule of the Combined Court which considers all votes that are not used during the year, as having lapsed.

The President considered that in the absence of any bye-laws, the matter should be decided according to the rules of Parliamentary Procedure. In all societies of this kind it is considered that when a money vote has not been used it lapses at the end of the current year.

The motion was then put to the meeting and carried unanimously.

In answer to a question of Mr. T. Daly, the Secretary reported that he had written to the Government respecting the sum required for Country Exhibitions, but had not received any answer.

The Secretary read a letter from Mr. E. E. H. Francis in answer to an enquiry for a possible preventive of Boiler Corrosion. Since receiving the letter he had called on Mr. Francis, and found him engaged in some experiments on the galvanic action of certain metals which he expected would lead to results bearing on the matter in question. In the event of success Mr. Francis would report to the Society.

Mr. W. P. Abell exhibited a series of specimens of boiler tubes, &c., to show the corrosive effects of bush water. He thanked the Society for the interest they had taken in this matter, especially as he had heard there were people who objected to the fact of there being any active corrosion here, but facts are hard things; and

the specimens of corrosion before them were sufficient to satisfy anyone's mind on that point. Fortunately during the greater part of the year here, the water is excellent for boiler-feeding purposes ; but it is during the dry months, and especially a dry season such as we have just passed, that corrosion takes place to such an alarming extent ; and if an antidote, or preventive could be found, then planters would not object to pay a high price for it.

The President asked if he knew the kind of acid in the water ; to which Mr. Abell replied he did not. Mr. Bellairs thought it was sulphuric acid.

Mr. Abell said whatever the acid, it produced a galvanic action on the metal ; of this he had ample proof, one interesting example he came across a few weeks back when examining some boilers, and found the cast iron bottom low water float, hanging about three inches above the wrought iron stays, these latter were corroded away to half their original thickness, whilst the cast iron was unaffected, clearly showing that the cast iron was the electro-negative, whilst the wrought iron was the electro-positive element ; this was corroborated when he saw that the float in the sister boiler was in electric contact with the stays neither of which was corroded.

In speaking of the bulged and cracked plates resulting from the use of muddy feed water, he pointed out the effectiveness of tapping the mill dock trench some four hundred yards from the buildings, and thus allowing the water to subside on its way to the well, instead of feeding the boilers with water constantly being stirred up by moving punts. The great difficulty of dealing with mud in our boilers here, was the fact of their being so seldom still, from the continued firing, and no mid-day, or night

stoppage as in England when the mud settled to the bottom, and was blown out before starting; however he was trying an apparatus to overcome this difficulty of settling the mud whilst firing, and if it proved satisfactory he would be pleased to place the results before the Society.

Mr. Abell said he would be only too happy to furnish Mr. Francis with any samples of water or specimens of corrosion he thought would further his investigation on this subject.

A cordial vote of thanks was accorded to Mr. Abell.

Mr. D. Skekel read the following paper on "An Improved three-roller Sugar Mill":—

The unprecedented and long depression the Sugar producing world has undergone, and the continued moderate prices obtained for our staple product—coupled as far as we can look into the distant future, with the uncertainty of any further improvement for the better—must be my apology for occupying your time, while I call your particular attention, briefly, to a description of the improved Sugar Cane Mill—a working model of which is before you for inspection and trial.

The planting community are now I think agreed that, to hold their own against the beet root competition, the most improved machinery from the hands of the engineer and the greatest skill in the manufacturing department by the chemist, are the two essentials wanted, and the gradual introduction of the most improved machinery into the colony testifies to this fact.

The introduction of the diffusion process on Plantation *Nonpareil*, and the application of the Triple effect apparatus, which is gradually displacing the old copper wall, will gradually but surely lead to good results. Mechanical subjects usually to those who do not understand them, or take an interest in them, are uninteresting and dry; but as several of my professional brethren are present, the subject I hope will not be void of interest to them; and the other gentlemen whose welfare is centred in the sugar cane product, will not, I hope, consider their time unprofitably employed in listening to my discourse as it concerns their future prosperity. The horizontal sugar cane mill of

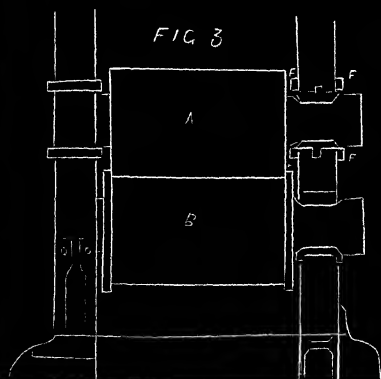
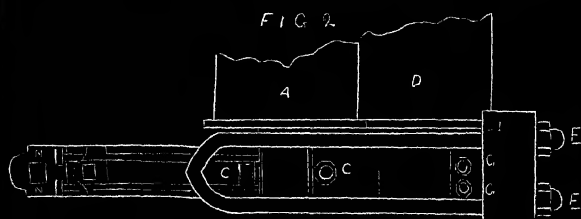
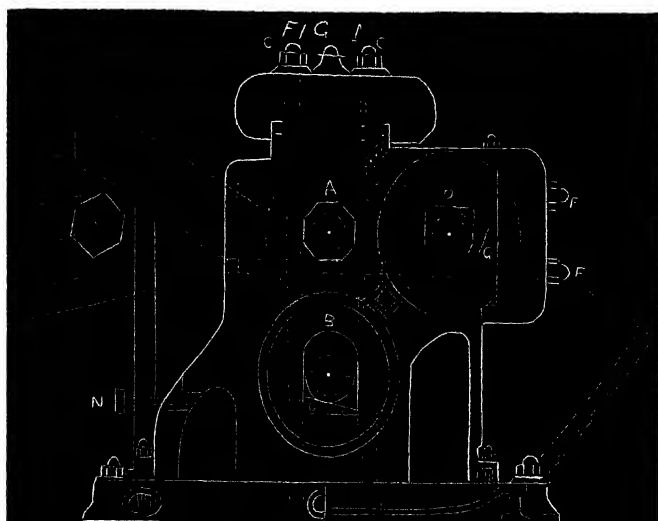
three rollers, in use all over the world, has remained in design the same as originally introduced (by whom we have no record). By this reference I allude, that the three rollers have always been arranged horizontally and tri-angularly, if we except vertical mills usually applied to windmills, and it remains an unaccountable fact, this design remains to this day as the best type of Mill in use.

The model before you is a departure from this type of mill and is designed with the view of adding additional strength to the mill and securing a higher extraction of juice from the cane.

The altered position of the rollers allows of a better arrangement of wrought iron bolts, in lieu of cast iron standards for carrying the enormous and irregular strains that sugar mills are subjected to.

In describing this mill I will divide same under two heads. Firstly, additional strength in construction as compared with ordinary mills in general use; and secondly, increased extraction of cane juice.

Firstly, additional strength in construction—By an inspection of the drawing, same being an exact representation of the Model Mill, you will observe that the cane or front roller, B Fig. 1, is placed vertically and under the top roller A. The position of these two rollers enables the strains to be carried entirely and directly through the two gland bolts CC, relieving the cast iron Mill cheek or headstock of all the strains that exists in the present triangular-mills in general use. The final crushing roller D is placed horizontally and in the same plane as the top roller A; the position of these two rollers enables same to be secured into position by the wrought iron strap bolts seen on plan Fig. 2 at EE and in Fig. 3 end elevation at FFFF. This arrangement makes a very strong connection, the strain being carried entirely by the wrought iron strap bolts FFFF and relieving the mill cheeks of all strain. Practical engineers are aware that a fractured headstock is made practically good by being strapped usually one strap to each cheek. By the application in the design of two straps to each headstock same being in the first instance in sound condition must add additional strength which I think will hardly be denied. Having conclusively proved to you by the foregoing that all the strains of the improved mill are taken up by the four gland bolts CCCC and the eight strap bolts FFFFFFFF the mill cheek becomes a standard only, for carrying the weight of three rollers, and keeping them centrally correct. If we accept the mechanical arrangement of the mill to be correct as I have described it, and that all the strains are carried through



IMPROVED
THREE ROLLER
CANE MILL
BY
DONALD SKEKEL
ENGINEER

the application of wrought iron bolts, it would almost amount to an impossibility to rupture the mill cheek, an accident we know of common occurrence to the ordinary mills in general use. I have now arrived at the most important feature regarding this improved mill—increased extraction of cane juice as compared with the mills in general use. In the ordinary Mill the final or crushing roller, also the front or Cane roller are placed considerably under the top roller, and makers of Sugar Mills have of late years placed the two lower rollers somewhat closer together, a mechanical defect against good squeezing, with the view of throwing the strain more on the gland bolts thereby relieving the Mill cheeks of a considerable amount of strain and preserving the headstock from being fractured. In attempting to get over one difficulty they have thoughtlessly run into a greater, as I will illustrate to you. Although I have stated that the closing of the two lower rollers is a mechanical defect for obtaining a high extraction of juice, I must qualify the statement somewhat, for the closing of the two lower rollers looking at its advantageous side, reduces the width of the trash turner surface, in other words making it narrower; this is undoubtedly an improvement as the friction surface on which the canes pass over is reduced.

I have always looked on the trash turner as a mechanical brake as applied to the ordinary Sugar Mill absorbing a considerable amount of power, and one of the most troublesome adjuncts of the mill to keep in order necessitating frequent repairs and renewals; and the engineer who invents an improved arrangement and thoroughly dispenses with its use will greatly improve the Sugar Mill.

Two perfectly circular surfaces rolling one against the other, of the diameters of an ordinary Sugar Mill roller, at their point of contact is merely a line of surface and at this point the final extraction takes place. the larger percentage falling inwards, this quantity of juice being apparently the percentage that the Mill is capable of extracting, but a careful observer will see that the Mill had really extracted a higher percentage, which by a defect in construction and design is lost, and the closing of the two lower rollers, already alluded to in a former part of my discourse, considerably aggravates this evil, which I will now endeavour to make clear. As I have just stated, when the ordinary Sugar Cane Mill is at work the largest quantity of cane juice falls inwards, but a careful observation will convince the most sceptical that a thin film of cane juice is carried forward on the surface of the final crushing roller a little beyond the point of contact; this loss constitutes

the defect in the ordinary Mill; and to overcome this loss necessitating double crushing, has been the outcome of the improved Cane Mill; that this defect exists is conclusively proved by passing the megass from the most improved Mill, without saturation, through a second mill,—maceration, and a considerable quantity of juice is obtained. I have myself by carefully conducted experiments obtained 8 per cent. additional juice.

By an examination of the model mill you will observe that I have succeeded in arranging the rollers in such a way that immediately the cane comes into contact with the point of pressure, the juice being liberated is free to fall by *gravitation* and cannot by any means be carried forward on the surface of the roller as is the case with the ordinary mill, to be *re-absorbed again*, thereby saving the loss of ten per cent.

As exception may be taken against my argument, that the position of the final roller adds to the additional extraction of a Sugar mill, I must ask you to look at the two diagrams illustrating my reasoning.

No. 1 diagram illustrates the position of one roller placed vertically over the other; it is evident in this case that a considerable amount of juice would follow the rotation of the roller and would amount to a loss.

In diagram No. 2, the final roller is placed in the same position as the model mill, and as gravitation acts against the natural law that carried the juice forward in No. 1 the juice cannot ascend but falls readily and freely away from the surface of the roller and forcibly illustrates the hydraulic axiom that liquid matter cannot ascend an incline.

The megass being delivered by the improved arrangement free from absorption of liquid matter as above described will be in better condition to be consumed by the general arrangements in use in the colony for burning this description of fuel. I have conducted several test experiments with the model mill, and the results have been extremely satisfactory. I have obtained as high an extraction as 80 per cent. of the weight of canes passing through the mill; this no doubt is a very high result, and I am also sensible that experiments conducted such as this has been, rather a laboratory one, cannot be taken as a practical working test, but I think 75 per cent. may be taken as the working result. Having practically obtained this result then I have as good a working percentage as is usually given out by double crushing involving the use of two engines and two mills, and fully 10 per cent. more than the most improved mill, single crushing, in general use, the percentage of which is about 65 per cent. in practical working.

I will now lay before you in a clear and concise manner the experiments conducted by me with the Model Mill.

First Experiment.—This was conducted by grinding four lbs. weight of canes, split up in such sizes as you now see before you. These pieces of cane had been exposed for 36 (thirty-six) hours to the action of the air, and had no doubt parted with some of their moisture, as the large amount of woody fibre, amounting to 18.75, they contained testifies.

Grinding this parcel, containing four pounds, I obtained as a residue one pound of megass, which is equal to 75 per cent. of the original weight of cane passed through the mill.

To find the amount of moisture contained in the sample of megass, to arrive at the amount of fibre contained in the cane, I exposed the same to the sun's rays for four hours and the decrease in weight amounted to the following:—

Loss in weight 1st hour 2 ounces.					
"	"	"	2	"	1
"	"	"	3	"	$\frac{1}{2}$
"	"	"	4	"	$\frac{1}{2}$

in all four ounces. At this point evaporation ceased, and the megass was as crisp as a biscuit and had parted with all its moisture. The mill having extracted, as already stated, 75 per cent. of the weight of cane, and having lost four ounces by evaporation, equal to 6.25 per cent., these two sums added together amounting to 81.25 represent the amount of available juice contained in the cane, and if we add 18.75 the amount of fibre contained in the canes to 81.25, the available amount of juice in the cane we have a total of 100 representing the original weight of cane.

Having ascertained that the mill extracted 75 per cent. of the weight of cane, and having found 81.25 as the available amount of juice contained in the cane, we come to the following conclusions, that 75 per cent. of 81.25, the amount of juice contained in the cane originally gives an extraction equal to 92.30, that is to say, the mill extracted 92.30 of the available amount of juice contained in the cane. In this experiment I omitted weighing the juice.

Second Experiment.—Having procured a better sample of cane, I ground ten pounds with the following result:—After passing through the mill 10 lbs. of cane, I obtained two (2) pounds of green megass, this is equal to 80 per cent. of the weight of cane passed through the mill, and to find the amount of fibre I dried the megass for five days,

which lost one pound in weight, leaving 10 per cent. fibre, having extracted 80 per cent. of the weight of the canes and lost 10 per cent. by evaporation: the available amount of juice contained in the cane was 90 per cent. and having extracted 80 per cent. of this quantity the mill really extracted 88·88 of the available amount of cane juice contained in the sample. I omitted weighing the juice in this experiment also.

Third Experiment.—I operated again on ten pounds of cane, varying slightly in quality to those in second experiment, and I obtained 2 lbs. 1 ounce of green megass, equal to 79·375 per cent. of the weight of cane passed through the mill; by drying the megass for five days, it lost 1 lb. 2 ounces, making the fibre 11·25 in the cane, and lost by evaporation 9·375 which being added to the extraction 79·375 of the weight of the cane, making 88·75 available amount of juice contained in the cane. The mill having extracted 79·375 of an available 88·75 contained in the cane, amount to 89·43 per cent. of the available amount contained in the cane. In this experiment I weighed the juice and the megass as follows:—

	lbs.	oz.	
Green Megass	2	1	=20·625 per cent.
Juice	7	15	=79·375 „
	<u>10</u>		<u>100·</u>

In adopting the new arrangement to existing mills now in use, the introduction of two new headstocks and fittings will be required, the present rollers now in use being retained; the foundation and the liquor plate arrangement will remain undisturbed. The centre of top roller of improved mill being higher than the ordinary Mill of equal dimensions, owing to placing the cane roller directly under the top roller, will necessitate the raising of the main driving shafts of mill to suit requirements of new mill; this can be accomplished by either elevating the present pillow blocks, or introducing new ones.

The introduction of Stewart's Hydraulic arrangement, a meritorious invention, now in general use in the colony, and which has considerably increased the yield of Cane juice from the Mills in general use, is equally applicable to the new arrangement, and can be applied in the usual way to the last crushing roller.

From the mechanical inventive genius of this gentlemen, engineers are now enabled to calculate the pressure in Tons, the amount of work

transmitted through the final crushing roller of a mill, which previously was hid in obscurity. The objectionable use of bolts for setting up the lower rollers has been dispensed with, the advancing of the rollers into position being carried out by the wedge piece GG Figs. 1 and 2 seen on the drawing.

The introduction of large Cane Mills of late years, has not given out that high extraction by grinding Canes in large quantities, as was anticipated, and having already stated that 65 per cent. may fairly be taken as the average extraction, I think I am fairly within reasonable bounds and am not under-rating the amount of work done. To illustrate my meaning I will take a mill of the following dimensions: 34 x 78 as a fair example. In arranging a mill of this size ready for work, the final crushing roller would be set about one eighth ($\frac{1}{8}$) of an inch of opening, but when the Mill is fully fed up this opening of one eighth ($\frac{1}{8}$) of an inch would gradually have increased to nearer three-eighths ($\frac{3}{8}$) of an inch of opening; this is caused by the spring contained in the whole mill as a structure, and the deflection of the roller gudgeons owing to their lengths between the points of support. This three-eighths of an opening between the final crushing roller is filled up by a wad of Megass of equal thickness under a pressure of 240 tons at least, on the point of being relieved of this enormous pressure, and immediately this takes place, the spongy nature of the Megass, and its ready property of absorbing fluids, the film of liquor already alluded to is *re-absorbed* by the outgoing Megass and detracts from the working result of the mill. I attribute these defects, and they fully account for the moderate amount of extraction, 65 per cent., given out by these large and powerful mills.

From the introduction of double crushing or maceration by Mr. William Russell few estates in the colony have availed themselves of the arrangement, this is attributable to the great expense incurred in placing into position the second engine and mill, necessary for the arrangement, and many have come to the conclusion that the gain did not compensate the outlay, the additional expense in fuel and labour being a drawback in working the second engine and mill; to obtain the additional percentage which I take at 10 per cent. which is now lost, by the Mills now at work, and with a reasonable amount of fuel and labour, the work must be done by one engine and mill and in one operation.

If I am not too confident, a prevailing weakness among inventors, I

am of opinion, that the improved mill will give out as good a result, as any double crushing arrangement in the colony. The expense in putting down an additional engine and mill, and the necessary additional boiler power for working same, would cost a large estate £6,000, whereas a planter can now alter his present mill and gain the same advantage at considerably less expense for the cost of two new headstocks and the engineering labour in erecting them.

All the parts of the improved mill are quite as accessible as the ordinary mills in general use.

The lower roller although placed vertically under the top roller is easily taken out without breaking down the entire mill, and is as easily replaced into position again.

To obtain all the juice contained in the sugar cane that is possible, canes must be ground in smaller quantities than is the prevailing practice, and any one arranging a new plant, I would recommend two moderate-sized mills being used, one on each side of the engine; the last crushing roller must be kept $\frac{1}{8}$ of an inch open, and the feed regulated to suit, with an arrangement like this, with two improved mills, 75 per cent. can constantly be obtained.

A description of an improved four roller sugar cane mill, the invention of Messrs. Fletcher & Lablanc, appeared in the *Daily Chronicle* of December 8th, and has been practically tested, the working results being highly satisfactory.

The base line of this improved mill being longer than the ordinary mills in use in the colony, would necessitate entire new foundations for its erection, but in the case of the improved three roller mill now before you, I have kept in view when designing same to obviate the above difficulty and expense in foundation matters, and the arrangement can be carried out with much less cost than the four roller mill, and I think with equally as good results; practically we have only to overcome re-absorption and the same good results would follow one mill or the other of the improved type. The introduction of a fourth roller, adding an additional squeeze as compared to the ordinary mill has its advocates and detractors. I may say that I belong to the latter class, and I base my practice on the following practical trial conducted in the Island of Trinidad, at the St. Madaline Factory, containing the most improved modern machinery, and it is as follows:—Mr. Fryer, of the Firm of Manlove, Alliott & Co., Agents for the Defebreaux, attached this apparatus to the mill at the St. Madalin Factory, one of Fletcher's 34 x 78,

and I understand that the experiments were carefully carried out, with the following results; that the per centage given out by the mill was quite as high, or I may say equal in both cases, showing that there was no advantage gained in decorticating the canes before entering the mill; from this practical trial, I base my opinion that a fourth roller which prepares the canes like the defebreur is not the important adjunct to the sugar cane mill as some people suppose, and it certainly introduces an extra trash turner which is not commendable.

Among the many ideas in connection with cane grinding a two roller mill has been suggested. As no design of this mill has come before the public, I take it was the intention of the promoters of this mill to have placed the two rollers vertically; this would certainly dispense with the trash turner, so objectionable in most mills, but I can hardly conceive a worse designed mill for re-absorbing, and a reference to Diagram 1 will show the lower roller being admirably placed for carrying forward by its rotation the cane juice to be re-absorbed by the outgoing megass to a higher percentage than the ordinary three roller mill.

The diminutive size of the model will prevent a whole cane being operated on at once, I have therefore split up the canes in sections, and the model is at your disposal for a trial.

At the conclusion Mr. Skekel exhibited a fine working-model of the Machine, and proved by actual experiment that the mill was capable of extracting 80 o/o of juice from the cane. The experiment was witnessed by the members with great interest, and a vote of thanks accorded to Mr. Skekel; discussion on the paper was postponed till the next General Meeting, the Machine being left at the Society's Rooms in the meanwhile.

The Secretary mentioned that the new Catalogue of the Library was now ready, and could be obtained by the members at 4/ per copy.

A vote of thanks was accorded to Mr. G. B. Steele for a copy of Beckman's History of Inventions, in four volumes which he had presented to the Library.

The Secretary read an extract from a letter from

Mr. W. Walker, thanking the Society for the honour done him by again electing him Resident Director in London.

The meeting then terminated.

Meeting held on 19th April.—Mr. P. H. Nind, M.A., President, in the chair.

There were 29 members present.

Elections.—*Members* : R. C. Mollon ; J. B. Woolford ; David Smith.

Associates : T. Bourne ; E. G. Massiah ; J. Dalzell.

The President before proceeding to the usual business intimated that he had a resolution to propose to which he did not think the meeting would object, although it was out of order. Since the last meeting of the Society the community had suffered the loss of a distinguished man, one who had been several times President of the Society, and who never spared himself in anything that he undertook for the benefit of the Society. He alluded to the late Mr. William Russell of *Leonora*, and he thought it would be a meet and proper thing, that the meeting should record its deep regret at his death, and its full appreciation of his services to the Society and to Agriculture in general. Up to a few years since, the name of Mr. Russell was interwoven with the acts and interests of the Society. By precept, by example, by the reading of useful papers, and the donation of prizes to stimulate thought, he had made his influence felt, and there was nothing that came before the Society that he did not push forward. William Russell was a

many-sided man and the many sides of his character had been devoted to the good of the country of his adoption, with which the Society is identified. He would therefore propose that the Standing Orders should be suspended for the purpose of passing the following resolution:—

Be it resolved, that this Society deeply deplores the loss sustained by the colony in the death of Mr William Russell, and desires to place on record its heartfelt appreciation of the numerous services he rendered to the Society in former years, and of his lifelong unselfish devotion to those interests which come so essentially within the purview of the Royal Agricultural and Commercial Society

The Secretary in seconding the motion said that by the death of Mr. Russell he had personally lost a very kind friend. When he (Mr. Hill) had arrived in the colony some eighteen years ago, Mr. Russell was one of the first to give him a helping hand, and by this help encouraged him to persevere in his career. He believed that Mr. Russell had been eminently noted for helping young men who came to this colony without many friends, and had assisted some who perhaps without that help might have gone to the wall. He could personally support what the President had said as to Mr. Russell's personal interest in the Society.

The motion to suspend the Standing Orders, and the resolution were both carried unanimously, and the Secretary was directed to forward a copy of the latter to Mrs. Russell.

The President intimated that Mr. Hawtayne had been good enough to promise to give the first of the series of Lectures, which had been under consideration for some time past. The date had been fixed and advertised, but being found inconvenient, it was now purposed to have the Lecture on May 1st.

Mr. Watt objected to the Exchange Room as a Lecture Hall, as being too small and inconvenient, and asked why the Lecture could not be delivered in the Reading Room?

The President replied that the acoustic properties of the Reading Room were not considered suitable.

After some slight discussion in which Messrs. Daly and Bellairs took part, the President intimated that the Directors would re-consider the matter.

Mr. D. Skekel's New Sugar Mill, the discussion on which had been postponed from the previous meeting, was now introduced, and the inventor intimated that he was prepared to answer any objections that might be made.

The President said that the two principal features in the New Mill, were, increased extraction of cane juice, and a greater strength of the rollers from the strain being thrown on the gland bolts instead of the head-stock.

A number of questions and objections were then made by Messrs. Jones, Abell, Steele and Bellairs, in which some of the objectionable points of various other mills were mentioned; and Mr. Skekel's trash turner in common with others as being in the way, was condemned, Mr. Jones being very severe against the abominable system of the trash turner.

The President then summed up the matter. He remarked that it must have been interesting to those connected with the sugar industry to find the engineers engaged in such a discussion. There had been a vigorous attack, with as vigorous a defence. No doubt each engineer had settled in his mind whether Mr. Skekel's Mill was a good one or not. He (Mr. Nind) had seen

several experiments made with it, and they certainly gave very good results. Practical men knew very well that results may be obtained from model machines, which cannot be procured in practice on a large scale. What was wanted was, to change the small experiment to a practical one. It was rather curious that at this time, when diffusion is being so much discussed, such a strong interest is felt in the Cane Mill. Diffusion had been tried in Java, but at present it does not pay as well as the ordinary crushing. A vote of thanks had been passed to Mr. Skekel at the last meeting, and whether the members present agreed with that gentleman or not, they must all feel that he had been the means of introducing a very healthy discussion.

Mr. Davis said that the discussion had been very interesting, and he only wished the professional members would read more papers to the Society.

Mr. Jones said that he had brought before the Society on several occasions, the desirability of their fostering the Export Fruit Trade. They had now something practical before them, in the shape of a petition to the Combined Court, for a subsidy to a line of steamers to run here once a week from New Orleans. The Company would be prepared to supply a large number of banana suckers, gratis, to such persons as were willing to grow them. He knew several planters who were prepared to commence planting as soon as they were assured that the matter was settled. Such a trade would be of enormous benefit to the colony, and he thought the Society should do everything in their power to support Captain White in his petition for a subsidy to enable the Company to do what they proposed.

Mr. Hawtayne said that this was such an excellent suggestion that he felt hampered by the rules of the Society which prevented a motion being discussed at the same meeting that it is proposed. If Mr. Jones would frame a motion by which the Society could bring its influence to bear on the Government without delay, it would be very desirable, and he would be glad to move that all rules which prevented motions being proposed and carried at one and the same meeting should be suspended in this particular case.

The President said that there was no doubt that this question might be an exceedingly valuable one to the country, and when we see that it is being taken up by planters and Government officers, all the members of the Society should sympathise with it. Considering that the Combined Court meets on the 8th of May and that there cannot be another meeting of the Society before that date, there was reasonable cause for suspending the Rules in this particular case, although he did not approve of such measures in anything but urgent cases.

Mr. Hawtayne then proposed, and Mr. Drysdale seconded :—

That the Rules which require Notice of Motion be suspended for the purpose of allowing the motion of Mr. Jones to be passed at the present Meeting.

The motion having been carried,

Captain E. T. White gave an account of the proposals of the Company which were embodied in the petition to the Combined Court.

Mr. G. Garnett thought that provision should be made for bringing fruit from the Pomeroon.

Mr. N. D. Davis remarked that the Banana Trade of

Jamaica had become so profitable that the subsidy had been dropped.

Mr. Jones then moved :—

That the Society address a letter to the Government supporting Captain White's petition, and recommending that a subsidy be given to a line of Steamers carrying fruit from this port to any port of the United States.

The motion having been duly seconded by the President, it was carried unanimously, and the Secretary was directed to forward a communication to the Government to the proper effect.

The President gave notice of motion that at the next General Meeting, he would move :—

That Schedule A, Chap. 1. Clause 2 be amended to read as follows .—

2. The Society shall consist of Honorary Members, Ordinary Members, Associates, and Corresponding Members of *either sex*.

The thanks of the Society were given to the Government for two copies of Sawkins & Brown's Geological Survey of British Guiana, and to Mr. J. B. Finney for a copy of Seaton's Marine Engineering, and also to Mr. T. Watt for a copy of the first part of the Annals of Guiana.

The Meeting then terminated.

• *Meeting held on 11th May.*—Mr. P. H. Nind, M.A., President, in the chair.

There were 11 members present.

Elections.—*Members* : Rev. James P. Taylor, T. W. Hutton, Harry Garnett.

Associates : Charles Crumpton, James H. Jones, George R. Greene, Charles Bosch Reitz, C. H. Simpson.

The Secretary mentioned that since the previous Meeting he had written to the Government Secretary embodying the Resolution respecting the Banana trade, and although he had received no reply, he was aware that the letter had been laid before the Court of Policy, and referred together with Capt. White's petition to the Combined Court.

The Secretary also intimated that he had forwarded the Resolution of Condolence passed at the previous Meeting to Mrs. Russell, from whom he had received a letter of thanks for "their kind expression of sympathy."

The Treasurer laid over a statement of the Receipts from Subscriptions for the current year, as compared with 1887, showing a decrease of about \$340.00. From new Members and payment of those now absent from the colony, he anticipated that the income would amount to about the same as last year. He also laid over the list of members in arrears, those in the colony whose names were to be struck off the list, as well as others who, being absent, would probably pay when they returned.

The President remarked that it was painful to be compelled to strike out the names of any old Members, but if they were in arrears it could not be helped, as Rules would be useless if not carried out on a business-like basis. The thanks of the Society were due to Mr. Conyers for his careful and exact statement.

The thanks of the Society were given for the following Donations to the Library :—

British Museum Trustees—Catalogue of Birds, Vol. XII.	
Baron Siccama, per Mr. } Netscher's "Geschiedenis	
W. H. Sherlock } Essequibo," &c.	

Government of B. Guiana—"Sugar Bounties Conference Reports," & "Consular Reports."

Colonel Figyelmesy —"Our First Century," and
"Field-Book of the Revolution."

The Secretary read a letter from the Government Secretary enclosing a circular from H R.H. the Prince of Wales, as President of the "Imperial Institute," asking for information as to the Resources of the colony, &c. It was referred to the Committee of Correspondence with the recommendation that the "Imperial Institute" be supplied with "Timehri."

The Secretary read a letter from the Mississippi Agricultural Experiment Station asking for information as to the Fodder Grasses of British Guiana, and also for a supply of specimens and seeds of the most useful ones.

The President remarked that it would be of advantage to the colony to receive grasses from other countries, as he did not consider the native grasses either succulent or nutritious as compared with those of some other countries where he had resided.

| Archdeacon Austin referred to the pastures in the
• Abary district as being exceptionally good.

The Assistant Secretary exhibited a collection of the best pasture and fodder grasses of the colony, including those of the coast, swamps and wet and dry savannahs.

The President remarked that he did not think any of the coast grasses were so good as that of the Berbice savannahs, this grew in tufts and was not so watery as most of the others. (This grass is the *Panicum Rudgei*.) The matter was referred to the Agricultural Committee.

Mr. E. E. H. Francis read the following paper on "Cane Crushing" in which he gave the results of some Laboratory experiments as to the proportional quantities of juice and fibre contained in certain samples of Sugar Cane, as compared with the quantity of juice expressed :

As a contribution to the discussion on cane mills raised by Mr. Skekel, I beg to call attention to what appears to me to be a remarkable, and an important point bearing on the subject; namely, that the percentage of juice obtained by crushing, is not altogether a function of the power of the mill, as it is usually assumed to be, nor, a fixed power being given, is it wholly dependent on the proportion of fibre (or juice) existing in the cane. At any rate, those are the conclusions that I have arrived at from the results of a large number of experiments made at the Government Laboratory—a table* of which I have the honour herewith to present to the Society.

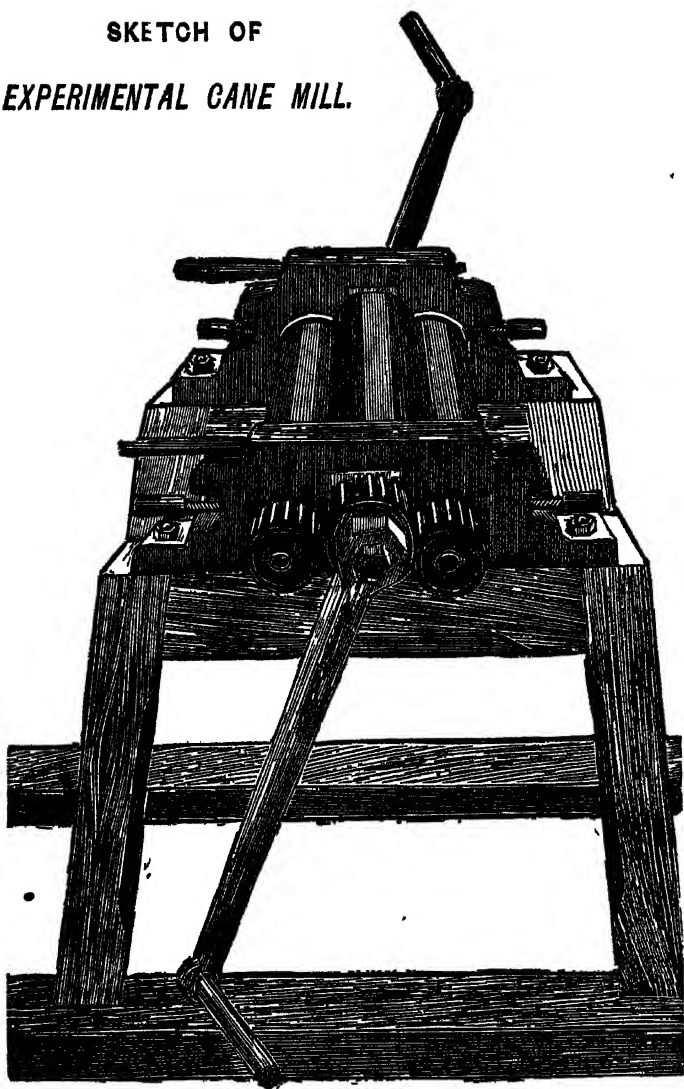
The mill used in the experiments was specially made for the laboratory at the Demerara Foundry. It has three rollers of dimensions 6×4 inches, which are turned by two powerful cranks acting directly on the upper or middle roller—motion being communicated to the two lower ones by means of cogs. I submit a drawing for inspection.

For feeding the mill the canes are cut into three or four lengths, each of these being then split in halves lengthways. The pieces are first run through the mill singly, then placed in pairs and passed through again with the rollers set closer, and so on a third or fourth time until no more juice can be obtained. By first weighing the cut canes and then the megass, the proportion of juice extracted is ascertained and the whole operation occupies about ten minutes. To determine the amount of fibre, the megass is alternately soaked in water and then passed through the mill, until all remaining sugar and other soluble matters are removed. The fibre, squeezed as dry as possible, is then tied up like a parcel in a sheet of filtering paper, and kept in a hot air oven at a temperature of 100° to 105° C. until it ceases to lose weight. This takes about four days. Finally, the fibre is completely burnt, and the weight of the ash deducted.

The procedure is practically the same in all cases, nevertheless, it will be seen from the table that the expression varied from 50.4 per

* See page 226.

SKETCH OF
EXPERIMENTAL CANE MILL.



cent. with sample 6, to 79.3 per cent. with sample 56, thus showing a difference of 28.9 per cent. in the crushing, although the proportion of juice in the two samples of cane differs by less than 5 per cent. Such a difference as these two samples afford is no doubt very exceptional, and may even be due to an error in the determination, although I can find no evidence of that being the case.

Apart from these examples, however, numerous others will be found in the table, where the proportion of fibre is nearly or quite the same, yet the crushing results vary largely as, for instance, with samples 1 and 2, 11 and 12, 17 and 19, 28 and 29, 58 and 67. In each case the proportion of juice yielded by grinding varies between 10 and 15 per cent. and the lower result is given by the cane containing the greater amount of juice.

I meant to have brought this matter to the notice of the Society at the last meeting, but as the results had been obtained only in the regular way of analysis, and were not intended to prove any such point as the one in question, I thought it better to postpone my communication until I had made some special experiments with as great care and under as similar conditions as possible. Owing to the long time required to dry the fibre, only a few of these have been completed, but as far as they go, they fully support the conclusions previously arrived at.

In making these special experiments the adjustment of the rollers of the mill remained unaltered throughout. The same two men were employed at the cranks (I being one), and the megass was squeezed and re-squeezed until no further juice could be extracted—the final squeezing being done with the megass in layers thick enough to require the utmost available power to get it through the mill. The crushing was performed in duplicate by using only half a cane for each experiment. Table II. gives the results obtained.

Being so few in number the results do not exhibit the striking differences met with in the previous Table, still they go a long way towards substantiating them. Thus, by comparing samples 1 and 3, and 4 and 7, it will be seen that both pairs differ to about the same extent in the amount of juice they contain, but, in the crushing, the former differs by only 2 per cent. and the latter by no less than 11 per cent. Samples 4 and 5, also, while containing practically an equal amount of juice, differ by about 10 per cent. in the amount they yield.

I am not prepared to say definitely why different canes containing the

same amount of woody matter should vary so largely in the quantity of juice they furnish; but think it probable that it may depend on the proportion of vascular tissue and cellular tissue respectively present—cane containing the larger number of fibro-vascular bundles in a given area, being possibly more difficult to grind than those containing fewer, whilst the actual amount of wood in each case may be the same. I think, however, the matter well deserves further investigation.

TABLE I.

No.	Per Cent. of Fibre.	Per Cent. of Juice in the Cane.	Per Cent. of Crushing.	No.	Per Cent. of Fibre.	Per Cent. of Juice in the Cane.	Per Cent. of Crushing.
1	14'51	85'49	70'3	36	9'61	90'39	65'8
2	14'15	85'85	57'5	37	9'58	90'42	67'8
3	14'10	85'90	63'8	38	9'50	90'50	70'0
4	14'07	85'93	64'6	39	9'42	90'58	63'1
5	13'25	86'75	60'9	40	9'41	90'59	67'7
6	13'25	86'75	50'4	41	9'40	90'60	66'5
7	12'99	87'01	61'7	42	9'37	90'63	70'8
8	12'85	87'15	65'8	43	9'34	90'66	65'0
9	12'11	87'89	57'2	44	9'30	90'70	69'9
10	11'95	88'05	72'2	45	9'07	90'93	69'6
11	11'90	88'10	61'6	46	9'04	90'96	64'6
12	11'70	88'30	71'2	47	9'02	90'98	65'6
13	11'67	88'33	64'7	48	9'02	90'98	76'1
14	11'62	88'38	59'4	49	8'97	91'03	76'9
15	11'50	88'50	65'6	50	8'86	91'14	70'9
16	11'42	88'58	67'5	51	8'82	91'18	62'9
17	11'03	88'97	70'9	52	8'72	91'28	65'4
18	10'90	89'10	68'4	53	8'70	91'30	64'5
19	10'83	89'17	59'5	54	8'64	91'36	60'4
20	10'78	89'22	61'2	55	8'56	91'44	68'1
21	10'78	89'22	63'1	56	8'49	91'51	79'3
22	10'63	89'37	65'0	57	8'11	91'89	71'4
23	10'62	89'38	67'5	58	8'03	91'97	77'8
24	10'47	89'53	69'0	59	7'85	92'15	67'8
25	10'44	89'56	69'2	60	7'83	92'17	66'2
26	10'43	89'57	65'0	61	7'66	92'34	70'7
27	10'42	89'58	65'4	62	7'53	92'47	68'1
28	10'38	89'62	72'4	63	7'48	92'52	71'7
29	10'37	89'63	58'5	64	7'45	92'55	65'9
30	10'18	89'82	73'8	65	7'40	92'60	76'8
31	10'07	89'93	73'5	66	7'18	92'82	64'4
32	10'04	89'96	66'4	67	7'01	92'89	62'7
33	9'90	90'10	68'0	68	7'02	92'98	76'3
34	9'80	90'20	69'3	69	6'66	93'34	69'0
35	9'66	90'34	68'4	70	6'62	93'38	76'8

TABLE II.

No.	Per cent. Fibre.	Per cent. Juice	Per cent. Crushing 1st half.	Per cent. Crushing 2nd half.
1	14.54	85.46	61.6	62.8
2	13.70	86.30	62.9	60.4
3	11.89	88.11	63.8	64.8
4	10.00	90.00	65.8	65.2
5	9.58	90.42	75.5	75.4
6	9.26	90.74	69.8	69.7
7	7.72	92.28	76.9	76.5

The President observed that the paper of Mr. Francis would be printed, and he thought it would be better to postpone the discussion till the next meeting. He proposed a vote of thanks to Mr. Francis, which was duly carried.

Mr. G. H. Hawtayne. read a short paper referring to some enquiries from Mr. Holmes, Curator of the Museum of the Pharmaceutical Society, as to a substitute for Gum Arabic and also as to the cultivation of Cubebs in the colony.

A specimen of gum from the common thorny *Acacia* (*A. tortuosa*) was exhibited, but this being very imperfectly soluble, it could be of no commercial value.

The Secretary stated that some trees of the species that yields Gum Arabic had been planted in several of the streets in the city which were growing very well.

The matter was ordered to be referred to the Agricultural Committee.

The Secretary read a letter from Mr. A. H. Bartley enclosing a request from Mr. H. D. Fisk, Illinois, for samples of Colony Woods, which was referred to the Committee of Correspondence, with the recommendation that specimens of the commoner kinds be forwarded.

The Secretary read a letter from the Government Secretary in reply to the request of the Society, that the Government Botanist be asked to supply specimens of the flowers, &c., of forest trees, in which it was stated that "the Government Botanist has reported that he will be very glad to use every opportunity which may occur to collect the specimens."

The Secretary read a letter from Mr. W. Walker stating that although matters in connection with Ridgway's Bankruptcy had advanced a little, the Trustees were not yet in a position to declare a Dividend.

In reply to a question of Mr. Bellairs the Secretary stated that he had not yet received any answer to the application to the Government for a grant for Local Exhibition purposes, but the Government had taken some action in the matter by placing an amount on the Supplementary Estimates.

Mr. Quelch exhibited a freak of nature in the shape of a perfect egg within another, which had been sent by Mr. J. S. Hill. Some specimens of Colony-tanned leather from M. G. De Freitas were also laid on the table.

The meeting then terminated.

Meeting held on 14th June.—Mr. P. H. Nind, M.A., President, in the chair.

There were 15 members present.

Elections.—*Members*: J. M. Moore, Hon. Geo. Melville, W. Rankin, Dr. A. T. Ozzard, and Dr. C. F. Castor.

Associates: R. P. Stewart and Robert Wolseley Odum.

The Secretary read a letter from the Committee of Correspondence concerning the matters referred to that Committee at the previous meeting, viz., request of Mr. Fisk, of Illinois, for specimens of Colonial Woods, and a request of H.R.H. the Prince of Wales for Colonial Documents for the Imperial Institute. The recommendations of the Committee in the latter item were directed to be forwarded to the Government.

Mr. D. C. Cameron as Secretary of the Agricultural Committee reported that that Committee were making enquiries in the matter concerning seeds, &c., of Fodder Grasses which had been referred to them at the previous meeting.

The Rev. J. Foreman gave notice of the following questions:—

1. Have any steps been taken to prevent the using of either the Reading Rooms or the Exchange Room by those gentlemen whose names have been crossed out of the List of Members and Associates for non-payment of their Subscriptions?

2. Does the Exchange Room yield any income to the Society, as seems to be intended in the Bye-Laws Chap. xii, clauses 4, 6 and 7?

The Secretary read a letter from the Government, intimating that the Combined Court had voted the sum of \$1,000 for Local Exhibition purposes.

The President thought that the Agricultural and Correspondence Committees should settle the matter between them.

The Rev. J. Foreman pointed out that Local Exhibi-

tions had always been left to the Committee of Correspondence.

. The matter was accordingly referred to that Committee.

The Secretary read a letter from Mr. A. Weber, the German Consul, referring to an Agricultural Exhibition to be held at Cologne on the 4th of August next. He intimated that there were classes for sugar, gums and oils, but as the time was so short there was no possibility of sending exhibits. The matter was referred to the Agricultural Committee.

The Secretary read a letter from the Government Secretary intimating that the Combined Court had passed a resolution, recommending a subsidy of \$25,000 to the Bay State Company, to be paid over a period of five years, on certain conditions, for the development of the Fruit Trade.

The President thought it most satisfactory that the Combined Court were ready to recognise a new industry and to vote money for its support. It was satisfactory to all present who took part in the discussion of the matter at a previous meeting of the Society to see that there was unanimity in regard to this, except on the part of His Excellency the Governor who did not appear to regard it with much favour. In other countries it was not common to grant subsidies in this way, but here the people had been accustomed to look to the Government for help in almost everything, and he certainly thought they did require a little help in this case, otherwise the scheme would fall to the ground.

Mr. Jones stated that the resolution of the Combined Court was very broad, and bound the Court of Policy to

no very special arrangement, but left it to form such a contract as might be most suitable. The amount proposed as compared with that granted in Jamaica was very small; there the subsidy was £5,000 per annum when the industry was started. When people came to this colony from far off countries they wanted some proof of our good faith and intention to promote the industry. A Company was not going to send down vessels and distribute plants without some guarantee. If a plantain grower knew that he could always find a market for his fruit, it would stimulate him to provide a crop for that market. He could only hope that the steps being taken would prove successful, and that the industry would be fairly started; and he would promote it by speech whenever he had the opportunity, and support the industry by practically growing bananas himself.

The Rev. J Foreman asked if the steamers would be ready when the crop was ripe, and also under what terms the £5,000 had been granted by Jamaica?

Mr. Jones in reply to the latter question, said, he did not know the exact terms of the contract, but he would be happy to lend Mr. Foreman a book on the subject by Governor Robinson.

Mr. F. A. R. Winter, in answer to Mr. Foreman's first question, said he understood that a regular line of steamers could only be established when the bananas were ready, which would be in 6 to 9 months, so that there would be plenty of time to make the arrangements.

Mr. D. C. Cameron called attention to what had been done by the Agricultural Committee, which had sent out circulars to the different farmers to get their views on the matter on the recommendation of the late Major Bunker.

The results of these enquiries had been, that the small farmers would not go into the industry unless some assurances were given that vessels would be forthcoming when the fruit should be ready.

The President said it was clear that the colony meant business and he did not think that the recommendations of the Agricultural Committee had been thrown away or forgotten. As to the Governor being opposed to the measure, this he considered to be accounted for by the deficiency in the Revenue. He thought that the matter might well be left in the hands of the Court of Policy who were well able to make the necessary arrangements.

After a little discussion in which Messrs. Davis, Foreman and Jones took part, the matter dropped.

The President invited discussion on the Paper read by Mr. E. E. H. Francis at the previous meeting on Cane Crushing.

In reply to a question of Mr. Jones, Mr. Francis stated that the experiments were extended over four months.

Mr. Jones remarked that his reason for asking was on account of the peculiar condition of the canes during the last month, all over the colony. He did not think he had ever seen such variations, both as regards polarization of the juice and its high percentage of glucose. The figures brought to their notice by Mr Francis were most startling, and he could not come to any conclusion, after most careful study.

The President then said that more explanation was necessary, and very important to the elucidating of the matter.

Mr. Francis explained that most of these canes were

experimental ones, and although they all came from one place they were of different varieties.

The President thought the difference would probably be accounted for by Mr. Francis' explanation, and again called attention to the desirability of such papers as that in question, for which the thanks of the Society had already been voted, and he could only say how much he had been interested in it.

The thanks of the Society were presented for the following donations to the library:—"Annual Register" 1780-1827, 50 volumes, from the Executors of the late W. H. Campbell; "The Caribbean Confederation," by C. S. Salmon, from the author; "Birds of British Guiana," 8 parts, from H. Whitely.

The Secretary of the Committee of Correspondence laid on the table a number of the Annual Reports of the State Mineralogist of California together with some photographs of gold mining works presented by the State Mining Bureau of California.

The Librarian laid on the table a very interesting collection of Dutch and German works bearing on the early history of Guiana, which had been lately bought in Holland. They consisted of early descriptions of Guiana, Charters of the West India Company, accounts of the slave insurrection in Berbice, &c., many of them official documents and a few MS.

The meeting then terminated.

ERRATA.

On page 101, line 21, for Haytia read Hayti.

„ „ 102, „ 1, „ Commandant read Commodore.

„ „ 144, „ 11, leave out Pimento.

A contribution towards the History of Demerara—1763.

*From the correspondence of Gedney Clarke, Esq. (Revised by James
Rodway, F.L.S., and in part translated from the French
by Mrs. George Melville)*

[THE following article is the first of a series, which it is intended to publish from time to time, as occasion may offer, of original or unpublished documents and other matter contributing towards a more complete knowledge of the history of the colony. The correspondence which is here presented, and which has been most kindly placed at my disposal by Mr. N. DARNELL DAVIS, was copied by Mr E. H. G. DALTON from the original papers in the British Museum. The letters have been revised by Mr. RODWAY, who has also prepared a short introduction to them; and Mrs GEORGE MELVILLE has most kindly translated those portions of the correspondence which were in French. The letter form has been retained throughout, since in this way a series of graphic pictures is placed before the reader without altering to any great extent the original cast of the documents; but unimportant and irrelevant details, incidental to such a correspondence, have been largely, if not entirely, omitted. Considerable interest is attached to this period of the history of the colony, about which, it appears, but little is known; and the special light which the letters throw upon the events and conditions of the times, will be the best guarantee of their importance.—ED.]



THE following letters give a very interesting account of the alarm and anxiety of the Demerara Planters on hearing of the Slave Insurrection in Berbice, as well as some very curious particulars concerning the wants of the planters. The writers, GEDNEY CLARKE Senior and his son, were Barbadians, the father being Collector

of Customs as well as a Member of the Council of that island. When grants of land were being made in Demerara, many of the Barbadian planters took up estates, and the CLARKE family seem to have had a very good selection. At the period in question the centre of the colony was the second island, but the Fort had not yet been erected, and there being no centre of the population, there were no means of protecting the plantations from an enemy. A small block-house or Brandwagt stood on the site of what is now the Stabroek Market, but this was only of use to give notice of the arrival of vessels. As may be supposed the unprotected state of the colony frightened the poor planters when they heard that all the slaves in Berbice had revolted, and threatened to come over-land to Demerara to set their brethren free, and drive out all the whites. The following plantations belonged to the CLARKE family at this time :—

GEDNEY CLARKE Senior—	Blenheim, near Tinaboe Creek,	granted	1752
GEDNEY CLARKE Junior—	The Loo	... ..	1752
"	Golden Grove	... ..	1753
"	Hampton Court, between Peter's Hall		
	and Diamond	... ..	1757
WILLIAM CLARKE	—Richmond, next Blenheim	... ..	1753
PIETER CLARKE	—York, next Loo	... ..	1753
FRANK CLARKE	—Friendship, next Golden Grove...		1752

Among the estate owners other Barbadian names appear; SAMUEL CARTER owned "Garden of Eden," JOHN CARTER "Diamond," and JOHN BIRMINGHAM was proprietor of "Lucky Hit," next to Peter's Hall, as well as Dalgin.*

* Hartsinck states that the slaves on Mr. Birmingham's plantation (Dalgin ?) revolted when they heard of the insurrection in Berbice.

The Dutch nobleman to whom most of the letters were addressed appears to have taken a great interest in the colony, and the CLARKES desired and expected that he would use his influence with the States-General and the West India Company, to put Demerara in a better position. The following particulars concerning this gentleman are taken from BURKE'S "Peerage," article "Portland":—

"WILLIAM, (BENTINCK), of Rhoon and Pendrecht in Holland, and Terrington St. Clements, county Norfolk, born 1704, created a Count of the Holy Roman Empire, for himself and all his descendants by the Emperor CHARLES VI., 1732, married 1733, the Countess CHARLOTTE-SOPHIE, only daughter and heir of ANTHONY II, Count of Aldenburgh, Sovereign Lord of Kniphausen, Varel, &c. by the Princess WILHELMINA-MARIA of Hesse Homburg, his wife, and dying in 1774, left by her two sons."

Captain Robert Douglas to Count Bentinck, introducing Gedney Clarke, Junior. Bergen op Zoom, July 12, 1762.

This letter will be delivered to your Excellency by Mr. GEDNEY CLARKE, junior, a gentleman who has large possessions in Demerary, and who has left England and come to this country on purpose to see what good we can get done for the inhabitants of that infant and negro starved colony; a motive that I am sure will recommend him to the favour and protection of your Excellency.

Mr. CLARKE will have the honour of delivering to your Excellency a Bundle of Night Caps which Lt.-Col. KEITH in passing here for the Army gave me for your Excellency, and which I have taken this opportunity of sending, as a very severe indisposition hindered me from accompanying Mr. CLARKE to the Hague. I flatter

myself with your Excellency's pardoning the freedom I take in writing.

Gedney Clarke Junior to Count Bentinck The Hague, July 16th, 1762.

I have the honour to present your Excellency with a plan of our fertile, tho' neglected River Demerary.* Let me petition a place for it in your cabinet. If not worthy enough, at least vouchsafe to honour it with your patronage and protection. Then shall its inhabitants, distant as they are, extol your bounty, and be for ever reminded of their duty.

Enclosure.—Memorandum concerning Rio Demerary.

About the year 1752 the first Settlements were begun in Demerary. The inhabitants as was natural, expected proper encouragement from their mother Country and were even promised it. Instead of which they have not to this day received the least supply of negroes or anything else towards the advancement of their Estates, so that they have been obliged all along with great risk, to purchase these necessaries at Saint Eustatius, the English Islands, or wherever they could get them and at any price. Without negroes it is impossible for them to cultivate their lands, so that without a steady supply of that article in particular, Demerary, fertile as it is, must dwindle and come to nothing. There should also be a Bank of Credit formed to give a lifting hand to the inhabitants and enable them to purchase slaves when they arrive.

* This was doubtless the "Caerte van de Rivier Demerary" dated 1759 and signed Laurens Lodewyk van Bercheyck, a copy of which is in the R. A. & C. Society's Reading Room. Bercheyck was Commandeur of Demerara, 1761-4.

The Commerce of the colony should be open to all ports of Holland.

A town should be built, a church erected and a minister sent out as soon as possible. A Battery should also be made at the mouth of the river to guard it against insults, &c.*

As to the fertility of Demerary, a better idea cannot be given of it than by saying what is fact, that notwithstanding the great difficulties the inhabitants have met with, they have absolutely at this time upwards of 25 Sugar works erected and far advanced, and at least 20 Coffee Plantations.† The ill-treatment of their mother country was sufficient to make them desert their habitations, yet the richness of the soil encouraged them to go on, still hoping one time or other to get succour from their Protectors in Holland, and it is evident to all who have been there that if proper encouragement is given them, the colony will in a short space rival that of Surinam.

Gedney Clarke Junior to Count Bentinck. Middelburg, 24th July, 1762

Your Excellency's goodness will, I hope, permit me to recommend to your knowledge my friend Mr. AMYOT, who has a fine Plantation in our Infant Settlement of Demerary, and who can give your Excellency all the

* The battery, now Fort William Frederick, was built during the French occupation, 1782-4.

† There are no returns of the shipments of produce from Demerara alone for this year, but including Essequibo, the quantities of the staple products of the two colonies were —2988 hhds Sugar, 43 hhds. and 238 bags Coffee, and 10 bags Cocoa, shipped in 10 vessels to Zeeland.

intelligence you can desire of the wants and fertility of that neglected River.

I shall not fail to furnish your Excellency from time to time with everything that occurs towards the advancement of that fruitful spot and I hope, nay, am certain, that the patriot spirit, which so brilliantly distinguishes your Excellency, will engage you sometimes to think on those distant climes. Extend, Sir, honour us with your much desired Patronage and Protection. So shall we have reason feelingly to say, you are the Patron of Industry and Father of the distressed.

Captain DOUGLAS, who is now with me, presents his compliments.

Gedney Clarke, Junior, to Count Bentinck. London, 27th May, 1763.

I have the honour to forward the inclosed to Your Excellency, and hope their High Mightinesses the States will take into consideration the deplorable situation of their Colonies, and at the same time that they will make some acknowledgment to my father, for the immense expense he has been at in sending ships and men over for the protection of Essequibo and Demerary.

I shall hold it a great honour to have an answer from Your Excellency.

Gedney Clarke, Senior to Count Bentinck. Barbados. 3rd April. 1763.

My son when he was at the Hague had the honour of being introduced to your Lordship; he wrote me that you had some discourse with him concerning that new Settlement of Demerary, and that you were inclined to give it all proper encouragement.

I am sorry to inform you, Sir, that RICHARD WILTSHIRE, Esq., a gentleman who went over to make a

purchase had just arrived, when he heard that there was an insurrection of the negroes at Berbice ; that they had taken possession of the greatest part of the Plantations ; and that the Governor had blown up the Fort, and made his escape on board a ship that lay very near ; and that they gave out they would proceed to Demerary and Essequibo, and do the same there. Upon this intelligence Mr. WILTSHIRE returned as fast as he could and arrived here last Monday evening. On Tuesday I despatched a vessel with some arms and ammunition, and yesterday I despatched a ship of Eighteen guns and two armed brigantines with Lieutenant TOWERS and one hundred marines and sailors, that Capt. WHULOCK, of his Majesty's ship *Pembroke* (Admiral RODNEY not being here) was so kind as to send in the ship. In the Brigantines there were Capt. JACOB SMITH'S Company of Men raised here, besides the sailors ; and I shall send a vessel over to-morrow ; so that I hope if the negroes don't pay the visit before those vessels arrive, all may be safe.

I have wrote to tell Mr. GRAVESANDE and desired he would order the ships from Essequibo to Demerary to make a proper stand there ; as the plantations are all upon the brink of the river, one armed vessel would defend a plantation against the attack of many thousand negroes. But I do not expect that they will be sent.

I despatched also a vessel on Tuesday to Governor DE WINDT, desiring he would without delay send up some armed sloops and men.

The negroes of Berbice it is said have sent to Demerary that those that will not join them they will cut off.

I have, Sir, had great trouble, and been at a vast expense in my buildings, and to clear the plantations

that my sons and friends have there ; and now just as they are brought into order, to have them destroyed hurts me greatly.

And this I must take the liberty to say that the inhabitants in Berbice have been reduced greatly within the last three years. I do not know how many soldiers there were there. I know there are none at Demerary, and I think not above twenty at Essequibo. By this piece of parsimony the States will lose the best Settlement in the West Indies. You may judge, Sir, of that, by my assuring you that every year after the next, I and my son G. C. should have certainly produced from our Estates as much Sugar, Rum, Rice and Indigo, as would amount to near Twenty thousand pounds sterling.

I have reason, Sir, to complain, and I do so, not only for myself, but on behalf of every inhabitant in that River. I will take upon me to say that if the blow be even now warded off, it will never thrive under the direction and management it now is. If the States will take it into their own hands and send a Governor of some consequence, with a Regiment, and make it a free port, it will very soon exceed every other Settlement they have in the West Indies. At present the Company allow their Governor not so much as I do the Manager of one of my plantations.

In short, Sir, everything has gone on so heavily and in such a languid manner that I have been very uneasy for some time. I am now much more so. I would not have presumed to have taken up so much of your Lordship's time and wrote in this free and open manner, did I not believe that you would be glad to know the particulars I have mentioned ; and I think if I had not

given your Lordship this information I could not have been excused.

G. Clarke, Junior, to Mr. André Amyot London, 31st May, 1763*

It is with great concern that I inform you I received three days ago letters from my father giving me an account that Mr. WILTSHIRE, a gentleman of credit, who went to Demerary to look at GASCOIGNE'S† Estate, was returned express from that river with an account that a certain CORNELIS ANDERSON had, a few days before, saved himself by flight from Berbice to Demerary with 126 of his best negroes, and gives the following melancholy relation of what happened in that river, viz., that on the 3rd March the creole negroes mutinied, and put themselves at the head of many others, to the amount of near 3,000, and began to kill everybody that opposed them, men, women, and children. This CORNELIS ANDERSON knows of ten plantations that they nearly destroyed, and killed the whole families, with all the Indians and negroes that stood by them. On the 7th or 8th March, the Governor (through fear or some other motive) blew up the fort, destroyed all the ammunition &c., and embarked on board a Dutch ship lying in the river, so that these murdering villains got possession of the whole river without the least trouble, chiefly occasioned, 'tis thought, by being afraid of them; for I am sure you and I with 20 more could have kept off 4,000 such rascals in that fort. One or two discharges

* Paulas Amyot, probably related to the addressee of this letter, was owner of Pln. Niew Amsterdam, the third estate below Christianburg.

† George Gascoigne owned Pln. Beehive at the mouth of the Camouni Creek, as well as Utica, the next estate up the same creek.

of cannon with shots well pointed would have drove them to the devil. Thus stands the case with the most unfortunate river of Berbice ; now for Demerary. These abominable murderers have sent word to our negroes to join them or they will cut their throats, with all our white people, which they intend to do, as soon as they have done with Berbice, for, say they, we have long enough had a white Governor and masters, we will now be free ourselves. Judge then of our situation, everyone frightened to death. But my father, always attentive to the good of our colony, as soon as he heard of this disaster, immediately sent away in 6 hours a sloop with ammunition and provisions, and three days after hired at his own expense 3 vessels, a ship of 18 guns, two brigs of 14 guns each and an armed sloop. He made use of all his interest besides and got 100 marines with their officers, from his friend the British Admiral in those seas, and besides these he raised at his expense 50 of the Barbados Volunteers who went to Martinique, with their proper officers. These troops, with the crews of the vessels sent by him, will amount to near 300, which I hope will stop the progress of the damned negroes if they come our way. One vessel and the 50 Barbados Volunteers are stationed at the Loo, and are to make a breastwork all around my buildings of mud, that is to be the upper head quarters, so I suppose your manager and negroes (if in danger) will come down to us. The other vessels are to be stationed in different parts ; and this all my father's management, who I suppose will save the colony from destruction, which would otherwise I fear, fall an easy prey to these cruel, bloodthirsty negroes. God send they may get in time ; but CORNELIS ANDERSON did not get to the

river till the 17th March, and my father was so very expeditious he got his vessels away from Barbados by the 28th same month, but eleven days in all. I make no doubt but our people will behave like men if they are attacked ; but I think it a hardship that my father should be at all this expense alone, and I think the Company should repay him with thanks, and take warning from this dismal catastrophe how they leave their colony unguarded. I have wrote to Middelburg about these matters, and to Count BENTINCK at full length, and I think you should immediately set off to consult that Nobleman and the Directors of the Company to send some succour and relieve my father, who ventures his private fortune for the whole colony. This is the most terrible work that could have happened to us, and unless a whole Regiment is sent into those parts, and all the Caribbees brought to extirpate these wretches at once, depend upon it our colony will never thrive. Good God ! who would have thought it. I pity Messrs. J. MARTIN and ANGELY, for I suppose they have lost likewise. Pray my service to them and advise them to settle now in Demerary if we get clear. This is a most serious affair, and the Company should immediately build a town and erect Batteries on Borselen Island, which would always secure the River Demerary and be a proper place for the shipping to be at anchor to load. Let me again repeat that it is necessary you should use your utmost endeavours to get succours sent out to the colony, and between ourselves I don't know whether you have not now a good opportunity at Amsterdam to come in for a share of our trade. I shall be very anxious to know the result of your negotiations.

P.S.—As soon as my father heard of this disaster he sent an express to Governor DE WINDT. Pray show this to his son-in-law, with my best compliments. He no doubt will go with you to the Hague and Middelburg. Mr. LA COUDRE'S* presence will help you no doubt, and I think you had best assure our superiors that, unless they send out immediate succour to us, we are now determined to quit the colony with our negroes, &c., and go to settle among the English at Tobago, for I am sure you think with me that the first loss is always least.

Count Bentinck to Gedney Clarke, Junior. The Hague, June 3, 1763.

I received the day before yesterday the letter you favoured me with of the 27th of May, with the enclosed from your father. We had already had confused accounts of the insurrection of the Negroes at Berbice, and of succours sent from Barbados. The letter I received from your father gave great light as to facts, and at the same time states the case as to what is to be done. I send you my answer to your father under flying seal, that you peruse it before you further it, which I beg you would do by the first opportunity. I desire you to continue informing me exactly of whatever particulars that may come to your knowledge, and to write to your friends and acquaintances here, who are interested in those Colonies, that if they wish to be served with zeal, they will do prudently to let me know what is doing, and inform me in time of the true state of the affairs in these settlements; and I will do my utmost endeavours publicly, or under hand, as occasion shall require, to be

* A planter in Berbice.

of use to them. I desire you to send my most sincere compliments with this letter to your father. As it is by you that I am known to him, I desire, whatever be your private judgment, to keep his opinion of me, till I shall have had an opportunity of proving by facts that I am not unworthy of the favourable one he seems to have already formed on your reports, for which I am very much obliged to you.

P.S.—I am almost ashamed of thanking you so late for the turtle you were so good as to send me ; which was a very acceptable and agreeable present. But I was so thoroughly persuaded of your being gone back to Barbados, that I was not a little surprised at seeing your letter of 27th May, dated from London

Count Bentinck to Gedney Clarke, Senr. The Hague, June 3, 1763.

The letter you favoured me with from Barbados in date April 3, came to my hands the 1st instant. I immediately communicated it to the principal members of the Government, and I do not doubt but in very short time I shall be able to let you know what measures will have been taken for the security of this important Settlement. Meanwhile this serves only as an acknowledgment of the reception of your letter and of my not having lost one moment of time to do justice to your diligence and zeal in taking such proper and such speedy measures as you have done. The States meet Wednesday next. You may be sure that I will do my utmost endeavours to procure all the help and assistance possible, and as speedily as the nature of our Government will permit. The information you have been so kind as to send me was more exact and more precise than any that had arrived before. So that your letter will be of great use

in the deliberation on this important point. I return you many thanks for the honour you have done me in applying to me; and beg that you will never spare me, whenever there is any opportunity of being of any use or service to these settlements, the welfare of which, I have more at heart than I am able to express, especially since the informations I have had of their great and almost incredible value by your son and by Captain DOUGLAS, besides what I know to the same purpose from several others. As you are so considerably interested in these Colonies, I will not fail informing you regularly of the progress and success of the measures taking here, which I think you entitled to from me. The acquaintance I had the pleasure of making last year with your son gave me great satisfaction, which is much increased by the opportunity of serving you in such a laudable plan as that you go upon, and will be much greater still, if the success answers my expectation and my wishes.

Gedney Clarke, Junr., to Count Bentinck. London, 7th June, 1763.

I have just had the honour of receiving your obliging and most welcome favour of 3rd instant with the enclosed for my father which I shall send to him by a vessel next week.

I now have the honour of forwarding you another letter from him relative to the affairs of Demerary, Essequibo and Berbice, which although more satisfactory is still very alarming, and indeed unless some step or other is taken to support us, we must with regret quit the colony and fly for protection elsewhere, for your Excellency and every man of honour must and will allow, that men's lives and fortunes are not to be trifled

with at this rate. I shall give you all the information in my power.

P.S.—Since I had the honour of seeing Your Excellency something has happened much to my advantage, and I intend to continue in England for some time, though I shall every now and then pay a visit to the colony. If anything now is going forward I beg leave to recommend Cp. Douglas.

Enclosure.

Gedney Clarke, Senr., to Count Bentinck Barbados, April 13, 1763.

I had the honour of writing to your Lordship the 3rd instant concerning Berbice and Demerary, by the way of England; I send a copy with this by the way of Ireland; and have the pleasure to inform you, that I have this instant received an express from Demerary that the negroes had not moved from Berbice, that they were revelling, eating and getting drunk, but that they intended to march very soon. Many of the inhabitants have escaped and got down to Demerary; they confirm the first news that the negroes were in possession of the whole river, but their power was divided. Every large plantation had a Governor, and there were quarrels and disputes among them. As the five vessels I sent over were arrived, the inhabitants were very safe; but as soon as they leave the river, their danger will be as great as ever; they will always be in dread and fear, so as to neglect their business, and perhaps leave the river.

I beg the liberty therefore to repeat what I did in my former letter, that unless the States take those rivers into their own hands and send a sufficient force, they never will thrive. A regiment will be proper, and that without loss of time, in Demerary, where the stand

against the Berbice negroes must be made ; if that force be not sent forthwith, I assure your Lordship, the inhabitants will remove their negroes and valuable effects. In short, Sir, if that large tract of land is worth holding, it is with great submission I ask, whether it would not be highly proper to send a force sufficient to reduce those rebellious negroes of Surinam and those also at Berbice at once ? It must be a large body of men, and indeed they will find much difficulty ; but if divided in two bodies, one to proceed from Surinam to the West, the other from Demerary to the East, they will have the negroes between them. This I am assured will be a work of time, and expensive, but unless it is done, I have not the least doubt but the negroes will in few years be in full possession of that whole tract as far as the river Oronoque.

I hope, Sir, you will pardon me in presuming to offer my sentiments upon this head ; I have done so as I have visited those rivers of Demerary and Essequibo, and know full well the disposition of negroes, they are never to be trusted or depended upon. I have wrote thus much for the good of the public, in which light I hope your Lordship will receive it ; and that you will be pleased to direct that I may be informed whether a force will be sent directly to Demerary, so that I may inform the inhabitants as soon as possible, until I receive that notice, I shall propose to keep two armed vessels in that river.

Gedney Clarke, Junr, to Count Bentinck. London, 16th June, 1763.

I have the honour to inform Your Excellency that I have this day received a letter from my father, dated 20th April, with advice, that his small Packet was just

then arrived from Demerary, and brought the agreeable news that everything was well there, but that they were still in fear of a visit from the murderers of Berbice, though fully determined to give them a warm reception, if they had the audacity to attack them.

I hear of none of the negroes of our colony having joined them—which is a most favourable circumstance—but knowing the country, I must declare without flattery to my father, that it is chiefly owing to the speedy and seasonable succours he sent them ; for the Inhabitants of the Upper Part of Demerary had already quitted their Plantations above and fled for safety to those below, and it is not improbable but this may happen again, unless such measures are fallen upon in Holland as to make them all easy and happy, and to raise them beyond all fear of such attacks for the future. My father adds that Govr. DEWINDT of St. Eustatius had sent up three sloops with men, arms, ammunition &c., and that they arrived at Barbados the morning of said 20th April to gain intelligence of him. They were to sail in a day or two after, and I suppose by the 1st May were got to Demerary if no accident happened to them.

~ This reinforcement with the force already there, will no doubt protect our colony for a short time. But, alas ! how can it be expected that private men should support and defend for ever the honour of a nation such as Holland, and the particular interest of the individuals of a whole colony. It can never be imagined nor surely is it consistent with the spirit and grandeur of the States-General to suffer it. So puissant a body as that is, will no doubt relieve us from our distresses and no

longer suffer private Companies to trifle away the lives and fortunes of those who settle in their Colonies, flattered with the hopes of being by them protected.

For my part, Sir, I thought myself happy in being under your protection, and so confident was I of it, that not satisfied with the estate my kind and indulgent father gave me, I purchased more land and erected other works, which are just now ready finished for the depredations and excesses of those merciless wretches who give no quarter, wherever they go. How soon they may come upon us, God only knows; but whether they do it or not, sooner or later, it is certain that all work at present is stopped, and everything going to ruin and destruction, and I will take upon me to say that nothing will prevent it but the total extirpation of those blood-thirsty savages.

We have long been fighting uphill, and I believe I speak the voice of the colony when I assure your Excellency that our patience is tired out. If something therefore is not immediately done for the support and advancement of these long and shamefully neglected Rivers, I cannot take upon me to say what will be the fatal consequences. But we have one pleasing hope remaining that may soon dispel the mist and bring us, peace and comfort: a generous and a powerful Benefactor stands up in the cause of liberty and the support of our rights, whose candour and firmness will we trust soon convince the world how glorious an act it is to relieve the distressed, and that the ancient spirit of the Dutch Nation has not left them. I need not tell your Excellency that it is you I mean, nor have I at present more to say, than that I shall esteem it the greatest

pleasure of my life to convince you by action as well as words.

Count Bentinck to Godney Clarke, Junr. Hague, June 28, 1763.

I am favoured with your letter of the 16th inst. ; what occupies the present attention is the sending immediate succour to the Berbice, and rescuing that colony. What relates to the security, conservation and improvement of the neighbouring colonies, hardly merits less attention. The interest that you have in that of Demerary and Essequibo and your possessions there, have given you an opportunity of judging by your own observations, what difficulties there are in effectuating any timely and proportionate measures. I flatter myself that the misfortune which has happened at Berbice will open people's eyes and, convince them of the absolute and indispensable necessity of taking precautions to prevent the like happening in all the other colonies, which I own that I dread, and am in much more fear about them, than others, who, notwithstanding the interest they have there, seems to be. I shall be mightily obliged to you if you will be so good as to send me the materials, which might serve for forming a plan for the greatest advantages of our Colonies in America. I am afraid that the whole establishment of them is defective in many points. No body can furnish better materials than your father, who, by what I see, as well as by what I hear of him from others, must be a man of superior genius, talents, and spirit, and whose experience and knowledge of that part of the globe, as well as of what is the nature of a colony, make him more proper than anybody to give the

necessary information. You may be sure that I will make the best advantage of whatever he will be pleased to send me, and do my utmost endeavours to remove the difficulties which might obstruct the execution of what he might propose. Meanwhile I will collect among your friends here, who have a common interest with you, all the information possible, and distribute them beforehand and by degrees, to those from whom I may expect support and assistance. I beg you would present my most sincere and hearty compliments to your father, and assure him, that I neglect no opportunity of doing him justice, nor of showing in its true light the spirited and manly part he has acted in this affair, which will be acknowledged by those who have the benefit of this important service.

P.S.—I intended writing to-day to your father but have been hindered. I beg that if there occurs any opportunity for Barbadoes you would be so good as to send him copy of this letter, that he may see the regard I have for him and the attention I give to what comes from him. I will not fail writing myself.

Gedney Clarke Junr, to Count Bentinck. London 8th July, 1763.

I have duly received your Excellency's letter of 28, June and have already sent a copy of it to my father. I have since then received letters from him of 26 May. By his last advices from Demerary all was well there, but the inhabitants are in daily expectation of a visit from the rebels of Berbice, who had been repulsed in an attack against the troops sent to Berbice by the Government of Surinam, with loss on both sides.

My father mentions with concern that as Admiral

RODNEY, (his very good friend), was obliged to return to England shortly, he had much against his inclination sent for the 100 marines and seamen he had lent my father for the protection of the colonies, and those troops were already arrived at Barbadoes. He says also that he is afraid he shall not be able to keep the Barbados Volunteers at Demerary much longer, as they say, they see no prospect of being succoured by those to whom the colony belongs, and they will not be sacrificed on their account. My father's weight with them, and the money he has distributed among them, have kept them there till now, and he hopes he shall be able to keep them some little time longer. In the meantime he is obliged to victual them, and in short keeps them there merely by threats, arguments, and the force of money. This is a disagreeable circumstance, and I must say a good deal occasioned by the backwardness if not the pusillanimity of some of the inhabitants, who are frightened out of their wits; and I will take upon me to say further that their puerile behaviour had liked to have occasioned a revolt in our colony. Many flew to the mouth of the Demerary as soon as they heard of the insurrection at Berbice. Mr. SAMUEL CARTER, and my father, and my managers, with a few others, put their plantations in a posture of defence long before my father's reinforcements arrived. But had they given ground in the same manner as the others, nothing could have saved the colony, for our own negroes would have done the same as at Berbice and in a few days have joined. I could say a great deal on this subject but it is not immediately my duty so to do. However I must inform your Excellency that the colony is still on a ticklish footing, and unless some vigorous

effort is directly made we must be undone. The gentlemen in Zealand may think what they will of the matter, but they have certainly no time to lose, and I must confess long before this happened I began to repent having settled in the colony. I foresaw something fatal from the inactivity or the inability of certain parties.

Your Excellency's proposal is very kind and I know my father's intentions as well as mine own. They are that we should be as free at Essequibo and Demerary as at St. Eustatius, that a considerable Bank of Credit should be immediately formed for the inhabitants, that a proper number of slaves be immediately sent us, and that a proper Town, Church, Court House, and Battery be instantly erected on the first island in Demerary, for our comfort and preservation. At present we live like savages, never do we enter the doors of a church, nor are the inhabitants able to do this of themselves. Our superiors, those to whom the colony belongs, should set about it directly without the least delay, and they would soon perceive the great advantage of it. Indeed I will frankly own that unless we had had strong reason to expect the support of their High Mightinesses, we never should have settled in the colony. We are all much chagrined that we have been so long neglected, and I am, sorry, very sorry to say that unless something to the purpose is immediately done, we shall have good reason to curse the day we settled in the colony. I make no doubt but your Excellency will represent these facts in their proper colours to the States General, and that you will endeavour to procure us all the satisfaction that our unhappy cause deserves. We rely greatly on your friendship and protection, and by this time great expecta-

tions are formed from your well known goodness and power.

Gedney Clarke Junr., to Count Bentinck. London, 19th July, 1763.

As your Excellency commanded me to give you every information I receive concerning Demerary, I think it my duty to enclose you the last letter I have from my father, which I beg you will be pleased to peruse and return me at your leisure. The former part of it relates to family affairs, and the latter is wrote in so free, though just a style, that I would recommend to your Excellency to be cautious to whom it is made known, lest it might prejudice us with the Company, if we are so unfortunate as to have the colony remain in their hands.

We should be all rejoiced to have Capt. DOUGLAS to command the troops sent to Demerary, as he is a man of great prudence and steadiness, and one fit to govern both Dutch and English, were he made Commandeur of Demerary. At present I am sorry to say that we are in a deplorable situation in regard to support and everything else. My brother just arrived from Barbadoes gives a melancholy account of affairs in the colony. The Berbice rebels had even sent their deputies to tamper with the negroes in Demerary, as our people themselves confessed, and many would have already joined them had not the managers of my estates and my father with Mr. SAML. CARTER stood their ground with spirit.

Enclosure.

Gedney Clarke, Snr., to Gedney Clarke, Junior Barbados, June 6, 1763.

A vessel arrived on Friday from Essequibo. All quiet at Demerary, and will continue so, while Capt. SMITH'S company keeps there, and the armed vessels which I have desired might remain there until the forces come from

Europe. I hope they may go at once to Demerary. If they go to Berbice it will answer no purpose, as a small force will do more harm than good, and perhaps cause them to remove towards Demerary. The two vessels from St. Eustatius they, contrary to expectation, went into Berbice, where they stay, the Governor having offered a reward for all the rebels that can be taken. If that reward be given in Holland, they can get disbanded soldiers enough to come over; and can surely with the help of the Cariabbeans destroy every negroe there. The Loo is now filling up in Demerary and will sail soon.

SHAW sails for the Loo, as Manager next Sunday, a very good fellow; he came and offered his service by means of MCLEAN and WILSON; otherwise I should not have taken him. Old BLENMAN is very angry with him.

I hope Count BENTINCK may order out at first a Scotch Regiment. They may all settle there and he might know that now it is proper to send inhabitants from Europe (as we have many islands ceded to the English to settle) which there was no occasion for before the last war, if any encouragement had been given by the Directors. If they pursue my plan of a large force, they will take and cut off every rebellious negro from Surinam to Demerary. The Indians will all join and do more good than the whites in case they are supported. Indeed they may take many hundred prisoners which they may transport and send to the Islands. But I hope there may be an end of the Company. The merchants in Amsterdam and everywhere else ought all of them to join in petitioning the States to take the colony under their own protection. I cannot bear the thought of having anything under such a company. I gave twenty

pistols to send to Governor DEWINDT all express. He wrote me he would send two sloops over directly. Yesterday I received a letter from BIRMINGHAM who was then there (St. Eustatius) that Mr. DEWINDT could not take upon himself in behalf of the Company to send any assistance to Demerary; therefore he and the others interested there were obliged to subscribe to defray the expense; so you see not one Governor will take upon himself to lay out a penny to save a colony.

I don't know how Mr. GRAVESANDE can answer it in not sending an express directly as he had several vessels there.

They want provisions at Berbice, Mr. GRAVESANDE has desired me to send him forty pounds of beef upon account of the Company, which I have sent him this day. It is very evident if I had not sent over the five vessels that I did so expeditiously, that Demerary and Essequibo would have been lost. The inhabitants of the upper part of Demerary and Essequibo were flying as fast as possible; and would all have gone, had not SAMUEL CARTER and M'CLEAN prepared themselves for defence.

Count Bentinck to Gedney Clarke, Jnr. The Hague, Aug. 2, 1763.

I send you back enclosed the original letter of your
• father dated Barbados, June 6th, which you were so kind as to send me, for which I am much obliged to you. I have made the best use possible of the contents of it, as I certainly will do of everything you communicate to me. All I desire is that if affairs don't advance as speedily, nor go so precisely as one might wish, or perhaps have reason to expect, considering the importance of the affair on the carpet, it may neither discourage you, nor

give occasion to misinterpretations as to the activity or zeal of those you confide in. You know by your own experience the difficulties of various sorts, which cannot but attend an affair of this nature, where so many different private interests jar and obstruct the best measures.

Captain DOUGLAS goes on the expedition as Lieutenant-Colonel. He is the second person. Many reasons there were for his not being the first ; and I have convinced him of the solidity of them.

Time and patience will do a great deal in this affair. And what has happened at Berbice must necessarily open people's eyes, as it really does, as to what is absolutely necessary for the preservation of all the colonies on that coast, which many now seem convinced of, who had no notion of it before. I am fully convinced of the great service done by your father in sending timely and sufficient succour to Demerary, and of the great obligation due to him on that account ; and I heartily wish I may be seconded in my endeavours of acknowledging to him the importance of this service. I desire my most sincere compliments to him, and that you should assure him of my greatest esteem.

Gedney Clarke, Senr, to Count Bentinck. Barbados, Decr. 28, 1763.

I some time ago received the letter that you did me the honour to write me, on the 3rd June ; and also, a copy of that, of the 28th of the same month that you desired my son to send me.

I am obliged to you Sir, for the good opinion you entertain of me, and for the liberty you have allowed me to take in writing to you at all times when I may think proper.

Therefore I shall not neglect giving you my sentiments from time to time concerning the colony of Essequibo, and that in a free and open manner.

I have had a vessel that has constantly passed to and from Demerary ever since their being first in arms ; that I might give further assistance if needful. But I thank GOD everything has yet been safe, and will soon be entirely so ; the negroes that settled in Berbice are most of them dead ; the Generals destroyed themselves. The Indians (Charibbees) a brave and warlike people harassed them and killed great numbers ; if a proper spirit had been shewed at first, and those Indians had been under some expert officers, an end would have been soon put to that rebellion ; this plainly shews how serviceable they will be if the plan be pursued in extirpating entirely all those rebellious negroes, near Surinam ; to which number some of those from Berbice have retired.

The 13th of this instant, I had letters from Demerary, three men of war were arrived in Berbice ; the troops were not ; but a ship of my son's from London fell in with them on this side Madeira, so that I expect they got there the 25th.

- When the men-of-war arrived, Capt. SMITH applied to Mr. GRAVESANDE, desiring that his Company might be discharged ; but he refused, as he thought it better to keep them a little longer, lest the negroes upon the news of the forces coming might march over to Demerary. I have ordered an armed vessel that I have there to bring them away as soon as the Governor thinks proper to discharge them ; as they are at high wages, and much more expensive than regulars. I have been

obliged to give them such great encouragement, otherwise they would not have stayed ; I could not compel them. Beside the great expense of this Company, that of the vessels and buying arms and ammunition amounts to a large sum , and I besides sent over provisions by Mr. GRAVESANDE'S desire for the support of the people in Berbice ; all which you will Sir, I presume, think too heavy to fall upon me.

I am far from ascribing any merit to myself, but it is certain, had I not sent the timely aid and in the manner I did, Demerary and Essequibo would have been cut off, and Surinam would in time have followed, and in course the States would have lost that whole Continent.

What a pity it is, that those rivers have been thus neglected. If Demerary in particular, an Infant Settlement of a few years, had been encouraged properly, I assure you Sir that it would by this time have been full of inhabitants, and brought in a great revenue ; but it has been neglected in a most shameful manner, and for my part, I do not expect it much better under the direction of a Company ; but if they are to continue so, I hope and entreat that Demerary may be under a separate Government. They want no manner of assistance or anything else from Essequibo, the inhabitants of that river have always looked upon Demerary with a jealous eye ; a Governor, if he be a man of honour would soon change the face of affairs in Demerary. In your letter to my son, you desire I would send you my thoughts in regard to a plan for the better settling those Colonies ; I do not know how to set about it, the Government of the States being so widely different from that of Great Britain ; it is certain that there is nothing now, very

little more, than just the *appearance* of regularity and order, and until you appoint proper Governors, men of learning and spirit &c., and give them handsome salaries, and honorary, likewise you can scarce expect the colony to thrive.

When I did myself the honour of writing to you in April, I then wrote the Directors and I did so to show them I had not acted a double part ; but they have not yet been pleased to return me any answer ; they had not a right to be displeased (if they are so) at what I wrote them ; as I told only the truth and I had a right I think to tell them that.

If a fort should be ordered to be built in Demerary, there is no place in my humble opinion so proper as upon the left side upon the point as we enter the river.

Transactions in Rio Berbice and Demerary in December, 1763.

Upon the arrival of three men-of-war and some merchant-ships the Governor of Berbice, notwithstanding the 2 Battallions sent by the States were not yet come, thought himself at that juncture strong enough to attack the rebels. And he found himself in some measure under the necessity of doing so before any infectious disorder got among the people.

A Council of war was therefore called, and it was determined to pursue the plan formerly laid down betwixt him and Governor S'GRAVESANDE, vizt., to detach a body of men to Demerary, from thence to march across the country to La Savonette plantation in Berbice, where the rebels thought themselves secure, to make themselves masters of that plantation, and by that means to get the negroes between two fires.

In consequence of this resolution a detachment of 60 men arrived in Demerary the beginning of December. They were joined by Capt. SMITH with his Barbados Volunteers, sent by Mr. CLARKE for the protection of the colony, and the command of the expedition was given to Captain SMITH, whose bravery was often tried. This little army set off about the middle of December from the upper part of Rio Demerary, and after a very fatiguing march of 5 days through that immense forest, (trees only for their covering at night), they got to the boundaries of La Savonette, where SMITH halted and sent forward two faithful Indians to reconnoitre, with orders to be upon their guards and at the same time to be as particular as possible.

These fellows went on and having mounted on a tree near the plantation building, they perceived about 20 of the rebels patrolling before their garrison and keeping sentry. The remainder scattered about unarmed. They soon returned and made their report, upon which Captain SMITH formed his corps into three divisions, marching himself in the centre; and ordered them to give three huzzas as soon as they got within gun shot of the rebels, and proceed to action. This was performed with courage and regularity, and the rebels perceiving them flew to their arms and made a bold resistance for some time, they being 250 in number. But SMITH charged them so closely that they took to their heels and endeavoured to gain their canoes, and so to pass the river. But it was too late. Our people kept up a constant fire upon them, killed 64, and took 25 prisoners, among whom was their commander, a white man, who had assisted the rebels all along and who was a deserter. In this action there was but

one of our people wounded and that was a brave young Dutch Officer whose name is not mentioned. The remainder of the rebels flew into the woods, and must have been destroyed soon after the defeat. Captain SMITH employed his prisoners with his own men, to cast up a breast-work, which he soon rendered secure against 500 at least. Soon after this a sloop well armed as had been concerted, came up the river and joined Captain SMITH, so that the whole united forces of the Rebels cannot now dislodge them. The Governor of the Berbices was to go up that river on 19th Decr., and if possible to be before Peereboom plantation on 25 *Idem*, where there is a pretty strong brick house on a rising ground, to which the rebels have brought most of their ammunition, provisions, &c., with an intention as 'tis said to defend themselves to the last extremity.

The Governor will have with him 300 men, besides the crews of the men-of-war and merchantmen, and the St. Eustatius troops, so that in all probability these wretches will soon be extirpated.

The negroes that were taken at Savonnette declared that the white man with them had frequently urged them to march across to Demerary, and to attack that Settlement, which they would have done had they not had intelligence of the English forces being in that river, and of the arrival afterwards of the troops sent by the Directors.

In Demerary the 1 January 1764, the soldiers were posted on different plantations on that river and the ships the *Hoop*, *Cn. Jean Baak*, the *Land of Canaan* and the *Goode Verwagting*.

Translation (from French.)

Gedney Clarke Funnr., to Count Bentinck. London, 17th April, 1764.

On the 20th March, I had the honour of sending you an interesting account of the united action of the Dutch and English against the rebels of Berbice. I now Sir, take the liberty of presenting my brother to you, who is the bearer of this letter; having been frequently in Essequibo and in Demerara, he will be able to afford all the information you may desire. He crosses the sea with the purpose of making a tour in Holland; from there he goes to Brussels and on to France. I have urged him to be in Amsterdam for the meeting of the West India Company, which is to be held at the end of this month. He will most carefully follow your instructions, knowing as well as I do, what just cause our colony has to boast of your favour and protection. But we are in continued fear lest the endless disputes between the different chambers of this Company may end in bringing about the ruin and destruction of the colony, and even of the Company itself. Why will they not come to an agreement, and make Essequibo as open and free as St. Eustachius. This concession would certainly tend to the benefit of all. I am informed that Middelburgh used to insist on the exclusive right of commerce with St. Eustachius, even as she now claims that of our poor colony, while Middelburgh at the same time refuses us the slightest help.

France, Sir, acts on a very different principle; she knows that it is expedient to give every encouragement to infant colonies, or to those struggling against difficulties. The enclosed rules in favour of Colonists to Cayenne, must convince all of the firm purpose of France

to increase her power on the Continent of Guiana. The Marquis de Roux at Marseilles, a man of large means, has undertaken at his own cost, to send out two hundred German families to that colony in his service, giving them the same privileges as those granted in the regulations. In a letter received by the last post through a friend in Marseilles, I am informed that these families have actually embarked at that port. These new Colonists are also to be provided at Cayenne with negroes at a reasonable price, and are to be well and considerately treated; so that in a short time we shall see Cayenne become a flourishing colony. I take the liberty, Sir, of again recommending my brother to your favour and protection.

General Statement of the advantages granted by the King of France to all Colonists settling in Guiana.

The king provides each inhabitant with all necessary household furniture, all agricultural implements for tilling the soil and all sowing seeds. He undertakes to feed and maintain each inhabitant as stated, namely:—Food per diem during two years—1 lb. flour, $\frac{1}{2}$ lb. rice, or in lieu thereof $\frac{3}{4}$ lb. cassava, or the equivalent in price in beans or haricots, $\frac{1}{4}$ lb. fresh or of salt meat, or six ounces of lard, 1 gill of brandy or rum, equal to two English wineglassful.

Per month—2 lbs. oil, 1 bottle vinegar, 4 lbs. soap, 1 lb. burning oil, 2 lbs. butter, 2 lbs. salt.

Clothing per year during two years—1 Hat, 2 Linen Caps, 1 Woollen Cap, 4 Shirts, 2 pairs Cotton Socks, 2 pairs Leather Gaiters, 3 pairs Shoes, 2 pairs Wooden Shoes, 1 Suit, consisting of Coat, Waistcoat and Trou-

sers, of Cloth or other Stuff, 3 coarse Woollen working Vests and Trousers, 1 Coat, Vest and Trousers for ordinary wear. The King transports and feeds them during the voyage. Free exercise of Religion.

Count Bentinck to Gedney Clarke, Jr. Hague, May 28th, 1764.

I have had the pleasure of seeing your brother here, and by the account he will give you of my conversations with him, and the persons I have introduced him to, you will be fully persuaded of the truth of my intentions, and of my zeal to further and promote your views and designs. As I am not entirely deterred by difficulties, I shall continue struggling with these, which your brother will give you an account of. You will not be surprised after you shall have talked with him at my deferring as long as possible writing to you, having hitherto nothing agreeable to mention. I return you many thanks for the account I received from you in March of what had passed at Demerary and Berbice in December. And I shall be very much obliged to you if you will continue informing me of what you receive from these parts, that I may keep the thread and inform my friends and that they may be the better able to help you at the first favourable opportunity. I likewise desire you to present my most kind service to your father. I wish others here did him the same justice I do. And though hitherto, that has not had place I don't give up the hopes of seeing even that point take a better turn than it has done. One thing which is surprising is that none of the letters from our Colonies mention a word of all your father has done, nor the obligation they are under to him. This silence must either proceed from ignorance (which is impossible)

or from some other principle, which I had much rather not suspect, much less believe. I therefore desire you, as I have already done your brother, to inform me with some detail of what your father has done and continues doing for the preservation and welfare of the colonies. You may be sure I will make the proper use of whatever you shall impart me.

Translation.

Gedney Clarke, Junr., to Count Bentinck. London, 13th August, 1764.

Your Excellency's polite letter reached me safely, and I at once sent it on to my father, that he might see as you justly remark, that the inhabitants of the colony had not made mention as they promised to do in their letters, of the distinguished part he took in the recovery of the colony during the last rebellion. It but too often happens, Sir, that a noble and generous disposition meets with selfishness in others. We cannot therefore be surprised to see these same people, who, when in trouble, implored my father's help, now that their ends are gained, deny with ingratitude the service, or what comes to the same thing, shamefully neglect to mention their obligations when writing to their superiors. There are but two motives to which can be assigned such singular conduct. The one is Envy, which, as you know, Sir, always follows merit, the other, Avarice, which makes them fear being called upon to contribute their share towards the expenses of the expedition; but I flatter myself that your Excellency's discernment will do justice to my father's conduct, so that not only will his expenses be re-imbursed, but that he will also be publicly thanked for having saved the colony, the destruction of which would have been inevitable, if our forces

had not arrived in time to stifle the rebellion in Demerara, where it had also already begun to appear. I cannot however persuade myself that the Government of the colony will refuse to render him their thanks if they are called upon to do so. If they do we can produce letters from the principals, which I am sure will be sufficient proof to convince their Superiors. Monsieur VAN S'GRAVESANDE has no doubt acted very well, and is disposed to serve Demerara, but the rest of the gentlemen of the Council (a very small number excepted) are extremely jealous of the progress of this river, and, we have reason to believe, will do all in their power to prejudice and oppress us. We have long noticed this, and wished we were free from any connection with Essequibo, that is as a dependency of it. Our Commander VAN BERCHEYCK is dead. Here then is an opportunity of sending out a man of influence and decision. We would heartily join with the Company to increase his salary, which is so miserably small that we give yearly to those who have the care of our private plantations, much more than is given to him who has the charge of the Government. This may be a reason why we have been so badly governed for long, for no one would consent to accept the Governorship unless he saw his way to turn it to his own advantage. I feel sure that our condition will be aggravated if M. VAN BERCHEYCK, uncle of the late Governor, or M. HEYLIGER, obtain any post in the Government of the colony. The first solicits the Commandership of Demerara, and the second the Secretaryship for the whole colony; the one is no more eligible than the other for either of these posts. BERCHEYCK, being still at the age of fifty a young

and extravagant fool, and HEYLIGER having a stain on his reputation too well known to be repeated, and which far from making him suitable for public employment should make him hide his head in obscurity. I enter into these details because I know your Excellency will be glad to be made aware of all these circumstances, in order that you may prevent these men being appointed, who are moreover hated by the greater part of the inhabitants and who can do no good, though perhaps much harm to our young establishment. I hear from M. AMYOT, who is now in London, going on to Barbados, and from there to Demerara, that before he left Holland M. VAN OZEN had arrived there from Demerara. I was very glad to hear this; being an impartial man he is necessarily more qualified than any one to give you an exact account of the state of affairs; and will, if your Excellency wishes, impart to you all his observations on the subject. From the news I received from Middelburgh, it is evident that they now intend to make a compromise, and to put an end to the disputes which have existed so long in the different Chambers of the West India Company, and which have done so much harm to our colony. It would be a great boon and advantage were our commerce declared free and open. Were we put under regular Government, and proper encouragement given to the inhabitants, then would Demerara flourish, and she would soon prove herself worthy of your Excellency's protection and of the attention of her mother country. Awaiting this we are from day to day vigorously improving our establishment, my father having sent on the 20th June, twenty-four women slaves for our three plantations on that river, and intending to send in

three months time an equal number of men from Barbados. In this way we hope to convince your Excellency that we consider you as our patron and protector. I frankly own, that had we not had before our eyes your generous and firm behaviour, we should long since have removed our belongings from this colony, and I have reason to believe our example would have been followed by several others. It will be a happy event for us when the Prince of Orange attain his majority. My brother gave me an exact account of the gracious reception accorded him by the Prince of Orange, the Duke of Brunswick* and by your Excellency. I have not failed to communicate it all to my father, and I am sure he will feel the same sentiments of gratitude and respect as those which animate him who desires on all occasions to be considered.

P.S.—I beg your Excellency to read the enclosed letter I received from the Governor of Essequibo, which will further enlighten you with regard to the affairs of the colony; and after having noted the principal items, to let me have it back, while honouring me with your sentiments on the subject, and on what we have to do.

Laurens Storm Van s' Gravesande, to Gedney Clarke, Junr. Rio Demerara, 23rd April, 1764.

Sir,—This morning the 23rd April, I received your amiable letter of 13th February, which gave me infinite pleasure, first, because it is always agreeable to me to have the honour of hearing from you, secondly, because it is the first news we have received of the arrival of Captain STOFFEL, of which I was very wishful to hear because, by

* The Duke of Brunswick was guardian of the young Prince, and Count Bentinck a friend of the Duke.

that occasion I had written a very long and circumstantial letter to the Directors on the state of our colony. Although overwhelmed with business, having only arrived in Demerara three or four days ago, where we have a man-of-war called the *Zephir*, (Captain VAN OZEN) and the letter bag of M. DE BRUYN'S negro-ship closes the day after to-morrow, I cannot let this opportunity slip of acknowledging the receipt of your letter, and offering you a thousand thanks for the book you had the kindness to send me. I am curious to see what M. DE BELLIN says of our district of which I have no great opinion. On opening it on its arrival, I found several rather grave mistakes on the subject of our Coast. I have the pleasure to inform you that the rebellion in Berbice is over. Thank God, they are beginning to return each to his plantation. They have already held a dreadful execution, 32 rebels were hanged, 18 broken on the wheel after having their flesh torn off with red hot pincers, and 18 burnt alive. This seems to me a little cruel. There are still some fifty of the most guilty in irons. Our Caribs were of considerable service in this affair; they cannot be sufficiently praised for their faithfulness and bravery on this occasion. I have still a body of 95 men of this nation searching the woods and savannahs, to capture and strike down the rest of the fugitives. I never knew Berbice contained such a great number of slaves. They exceed seven thousand, and our Essequibo and Demerara together cannot at most have more than five thousand. Is it not a shame for a colony so widespread and so fertile! Whatever they would have us believe, there is no appearance that this will change before the majority of the

Prince of ORANGE. However, they write me that this very year navigation is to be made free. We shall see if it will be so. It has gone on so long, and they have promised so often, that I begin to doubt every thing. The negroes by this vessel have been sold at an exorbitant price, *f*400 and *f*450 was the common price, and many exceeded *f*600 per head. A short time before, a vessel of the Commercial Company of Middleburg was obliged to leave with her slaves without having sold any, because M. SPOORS would not take them at his own risk, and the Captain would not sell them otherwise. Would you believe it Sir! Still there is nothing moré true; the vessel of DE BRUYN would have been obliged for the same reason to leave with her slaves for Curaçoa, had I not done all in my power to oppose it, by assembling the Council and showing them, that if this vessel left without selling, we should likely remain ten years without another and the colony would be ruined in consequence. I prevailed so well by my speeches and persuasion that they resolved that the colony in general should take half the number at their own risk, and the other half at that of M. SPOORS, and so the sale was made. This is what these gentlemen the Directors, have permitted M. SPOORS to do as Sale-Master; to take the sales at his own risk, or not, as he pleases, which is the true reason why we have been so many years without slaves, for Merchants will not risk their capital so lightly, and they are right. There is not a single Slave-Master in all our Republic and its Dependencies, who has this privilege, and I cannot think why it was granted, as by the sale he runs little or no risk seeing that he has according to our

laws the right of preference and direct execution on those who fail in payment at fixed terms. But I am dwelling too long on these trifles. I have been obliged to open my heart at last, and write to the Directors naturally and without compliments, and as I had insisted on my resignation, I sent by STOFFEL DIERENT my report on the state of affairs, in which I spoke pretty strongly; and this is why I heard of his arrival with pleasure. I am the more gratified at having acted in this manner that I hear from the *Hague* that their Honourables had asked for all my letters, written to the Directors since the beginning of the rebellion in Berbice, of which I have already seen the result, since it has pleased the Honourable Company to instruct the Commander-in-Chief of the Troops of the State at Berbice, to act in every way in concert with me. Therefore I flatter myself that these letters will have a very good effect. The expedition of the brave SMITH has succeeded beyond expectation, not only in the destruction of a good number of the rebels, but the more so as it has, unintentionally, saved Demerara; for his detachment has just fallen on a body of rebels who were assembled in this spot, to march on and attack Demerara, having two great white scoundrels (deserters, one from Berbice, the other from Surinam) at their head. Therefore on the return of this expedition, our colony made him a present of a thousand florins. I forgot to communicate that we have contracted with Captain BOUWERS for a new lot of slaves, to be furnished as soon as possible by him, so I think we will not be long in want of them. Press on I beg you M. DE BRUYN to hasten his departure towards the coasts of Guiana. I


will write next week to PERSIK for mules for your plantation, I am surprised that they could not be got; it is not more than about three weeks since he received 26, and since then many others have arrived, but I greatly fear their being already sold; if they are not you may rest assured that you will get some, and if they are, I will take care that you get from the first that come.

The correspondence continued until 1766, but as the remaining letters only refer to Mr. CLARKE'S claim to a portion of the expenses incurred in saving the colony, it is not necessary to publish them in full. In 1765 GEDNEY CLARKE, Senr. died, and his son succeeded to his estates as well as to his post in Barbados. It appears that he made the very liberal offer of bearing half the expense of the expeditions, which were undoubtedly the salvation of the colony, provided the Government and West India Company paid the remainder. This had been after a great deal of trouble agreed to, but although he had a certificate under the seal of the colony signed by the Director-General, LAURENS STORM VAN S'GRAVESANDE, dated Jan. 6th, 1766, acknowledging the validity of his claim, he seems to have despaired of getting anything from the Company. Whether the claim was ever settled does not appear; perhaps the Minutes of the Court of Policy might throw some light on the matter.

A Trip to the Upper Demerara.

By the Rev. Canon Castell.

“ Pleasant it was when woods were green,
And winds were soft and low,
To lie amid some sylvan scene.”

O sings the poet, and equally pleasant was it for one, who is not a poet, to leave the hot and crowded city, with its filthy lanes and alleys, its fever haunts in some of the worst quarters, and revel amid the forest scenery of the Upper Demerara River, where for a fortnight or so, during the month of August last, it was my happy lot to be. Let me seek to recall a few pleasant memories connected with the trip.

We left Georgetown on a Friday morning, my boy and I, and reached Akyma, the terminus of the steamer route about seventy miles from town, at five in the afternoon. The same night we reached Muritaro, an Indian settlement and Church Mission station about fifteen miles further on. The boat we travelled in was one built especially for Mission purposes, and is considered to be the fastest on the river. It has no awnings at the sides, and only one large awning for the top sufficiently wide to keep out the rain. The principal seat is in the centre of the boat, and the rowers sit two on either side of it using a short spoon-shaped oar instead of paddles. The Indian lads who formed the crew seemed capable of enduring the greatest amount of

fatigue, and evidently thought nothing of pulling thirty or forty miles a day, with only a brief space for breakfasting.

We stayed at Muritaro till Monday morning, holding services on Sunday for the large and mixed congregations of river settlers, wood cutters, and Indians who assembled together at the various hours appointed. The Church is an exceedingly primitive one, built like the Mission house, Indian fashion, and open all round, with a large deep troolie covered roof.

The route from Muritaro to Malali on the Monday, was more interesting than the previous one had been, in consequence of its partaking of a slightly different character. The river itself is no longer affected by the tide, or only slightly so, and the scenery becomes more diversified; hilly ranges are seen more frequently, and rocks begin to be more numerous in the river. At Seba, the view is quite picturesque; while from the top of the hill itself, you look down on two bends of the river, and over long stretches of forest scenery, which are equally pleasant and attractive to the eye. We reached Malali, after travelling about eight hours in the boat, just as the school children were being dismissed. The soft voices of the Indian girls singing "Now the day is over, night is drawing nigh" sounded sweetly on the water; and the whole settlement stationed on a sandy beach at the foot of the rapids, with its well built church, and Indian huts scattered about, had a most inviting appearance, and one which the place itself did not belie, for it sheltered us most completely from a thunderstorm, which directly we had landed burst over the place, and for an hour we had

nothing but flashes of lightning and peal after peal of thunder accompanied by a deluge of rain.

The next morning after an early bath, we sent the boat forward over the rapids, and by means of a short cut across the hill, met it on the other side, when we again began to travel onwards as on the previous day. The scenery as before became wilder: there were more frequent indications of animal life, especially birds and insects, and the river being narrower, there was plenty of opportunity to note the various forms of vegetation that fringed its banks on either side. The most delightful characteristic of this part, however, were the long "itaboos," or water paths, cutting off long bends in the river; and which being wide enough only to allow the boat to pass through them, were completely covered over by the forest trees, thus forming most delightfully cool avenues, resembling in appearance small creeks. We passed through as many as four of them, one occupying us nearly half an hour. Just as it was getting dusk we reached "The Retreat," Mr. G. COUCHMAN'S well-known residence, where we had been kindly invited to stay for the night. A fine large meadow lies at the back of the house, affording pasturage to cows, sheep, and other domestic animals, and constituting a splendid poultry yard, where a large amount of stock was evidently being raised. In the centre of the meadow some young men were playing cricket. The scene was inviting enough to make one wish it were one's home. What splendid homesteads might there not be, established on the banks of all these rivers of ours, if—well, we must leave others more competent to discuss these "ifs." The next morning we were off by daybreak for our destination at

Eneyudah, which we reached shortly after noon, having breakfasted at Wobra Cobra, where we heard from a trustworthy settler of the benefit to be derived from the application of ordinary kerosine oil both internally and externally, in the case of snake bites. Several cases were related in which the oil certainly seemed to have been thoroughly efficacious ; and it would be useful if others would give us the benefit of their knowledge on this important subject. The Mission at Eneyudah is situate on the top of a sandy plateau, and is certainly one of the noteworthy features of the country. From the top of it you gaze down upon the river, studded with foam from the Great Falls, the dull roar of which can be heard in the distance, whilst, all round, you scan the surrounding country of unbroken forest, here and there rising into eminences of varying height.

Eneyudah is a purely Indian settlement. The only other resident person is the black schoolmaster, who when we arrived, was teaching a class of Indian lads under a huge tree. The rest of his scholars were at work under the open, troolie covered shed, which forms the school house. The Indians themselves in their shy manner soon came out to welcome us, and a few who had been out hunting, knowing we were expected, brought in several maroodis, and maam. In the upper part of the river fish and game seemed to be plentiful ; and we were frequently regaled with the most tempting delicacies of the bush ; wild hog, maam, and lucanani or the sun fish, being most to my taste. After resting a little, we took boat again for the Falls, about an hour's pull from the Mission. As we drew near, the river became covered

with thick foam, the noise of the falling water becoming more and more audible. On turning a bend of the river we caught sight of it. The water is seen to come tearing and dashing down through two main channels, forming a green islet in the centre : and on either side of these are two smaller channels, down which the water also pours itself over huge rocks and boulders, which are seen projecting themselves here and there above the surging mass. We drew as near as possible, and then landed, climbing to the head of the Falls, where we viewed them from above. After thoroughly satisfying ourselves, we returned to the Mission, where we passed the night pleasantly in the Indian hut, a small building lined and floored with bark. We held service with the Indians at half-past five the next morning in their rustic church, with its slabs from the forest for altar, trunks of trees for lectern and font stem, and long roughly hewn blocks of timber for seats ; all most delightfully in accordance with the genuine and unfeigned worship which these uncultured children of the forest love to offer.

After service was over, we set out for Mabooroo Hill, the highest eminence in the neighbourhood, between the Demerara and Essequibo rivers, and commanding a view of both from its summit. The walk to its base alone occupied fully five hours, and was tiring enough, up hill and down hill, through creeks and swamps ; but we were amply rewarded when we arrived there, for a more delightful spot for encampment could not have been found anywhere. It is formed by an opening in the forest where a large waterfall has made a rent of about a hundred square feet or so. We breakfasted under the trees, and after a brief rest began to climb the

hill. It took us two hours to reach the top; and at times it was so steep, that there was danger of slipping down for a considerable distance. The view from the summit was magnificent. The rock on which we were standing shelved down perpendicularly about eight hundred feet, and below we saw the forest trees dwarfed to less than half their size. In front there was an undulating expanse of forest scenery on all sides, as far as the eye could reach, with a faint white line in the distance, denoting a curve in the Essequibo river. Large masses of clouds were seen floating about, here and there discharging themselves on the forest beneath. We stayed for some time watching it all; and could scarcely believe we were only a few days' distance from the dull, flat, uninteresting country on the coast of the colony.

The Indians soon went off to shoot and hunt, whilst we descended leisurely to our halting place, chasing a red-haired baboon, however, on the way, and firing, but without success, at some large black Quata monkeys, which barked like dogs. After dinner we prepared to spend a night in the forest; hammocks were soon slung, and with nothing but a few troolie leaves tied from tree to tree, to keep the moonlight from our faces, we fell asleep. During the night a sharp shower of rain came on which woke us all, and then I observed a curious phenomenon, which at first almost startled me. Every fifth or sixth leaf on the ground beneath our hammocks, was covered with a phosphorescent light. I rubbed my eyes several times to be sure I was not dreaming, and at last leant over the hammock, and picked one up. There was no mistaking the fact. The leaf was covered with something which gave it a luminous appearance on both sides.

I held it in the dark, placed my finger in the centre of it, and saw the light on both sides, called the attention of the others to it, and at last became convinced that something or other was causing a certain portion of these dead and withered forest leaves lying underneath us, and for a short distance around us, to glow with a distinctly visible light. It was sufficiently interesting to cause one to lie pondering over the strangeness of the matter, during the remainder of the night.

At daybreak we resumed our route to the Mission, and by noon we were leaving Eneyudah and the Great Falls behind us on our return homewards.



The Free Rural Population, from a Medical Point of View.

By C. E. Macnamara, Diplomate in State Medicine.



JUST means of estimating the civilisation, intelligence and progress of a nation or community, is the appreciation in which it holds the Public health. History points out to us how that as nations became refined, the common *health* came to be regarded as the common *wealth*. Even at this age we can estimate with admiration bordering on wonder the provisions of ancient Rome for the common health. The gigantic water-works with the aqueduct mocking at the obstacles of hills and valleys and bringing pure water to the old city, the baths public and private, the principles of construction of the amphitheatre, and the open spaces for recreation, all shew how, in those bygone days, the intelligence and enlightenment of the City Fathers gave expression almost as a watchword to the saying "*civium vires civitatis vis.*" Time in its gentle effluxion has amidst many other things taught us that what was good for the citizen should be extended to the whole state, and that the cry should embrace all; and thus with the motto "*salus generis humani*" the great workers of to-day in the field of Sanitation press onward. The object of this essay

akin to this work, is to dwell upon three things, and to focus, as it were, attention upon them :—

1stly. As to how far the rural population in this colony is cared for, from a medical point of view.

2ndly. What might be done for it.

3rdly. What should *not* be done for it.

The first of these three questions is one so peculiarly enveloped in personal feelings, being as it is one touching upon an actual and present condition, that I do not approach it without a grave sense of the responsibility that any analysis of the question undoubtedly incurs ; such however must be faced in any appraisalment of the question. In our rural community two great systems touch each other, the indentured and the free. It were indeed as if in the words of LONGFELLOW, "*The Past and Present here unite, Beneath Time's flowing Tide,*" for somewhat of the old feudal system lingers with us in the bound man protected with all the enlightenment of advanced civilisation, and the free man—free indeed to the enjoyment of his own inclinations, but free also to the assailment of all the ills that flesh is heir to, and in such troubles much unadvised and practically unaided. The first kind of freedom he appreciates : the other he often deplores and remonstrates against. The public press of the colony frequently and justly opens its columns to such remonstrance from the poor and the free. It has been asserted that we have no poor amongst us, and that in this colony, where "there is bread and work for all," the poor man's cry is an exaggerated one. Poverty and riches are but relative terms ; and it is true that there is no poverty here such as is known in more crowded localities in countries in temperate climates, where if great riches

and the wealthy classes have selected to dwell, so like wise are the poor—not indeed in their midst, but, like wild beasts that might injure them, they are hidden away lest perchance their very misery might offend the eyes of the affluent. Such is poverty that must not ask for alms ! Such is poverty that must stretch the scanty garments across pinched and half starved limbs, lest their wretchedness being too apparent they should be hurried away, and jostled out of the arena, where many so disguising their misery seek work however hard, however menial, or failing this, watch with eager eyes—often never gratified—to see if amidst the crowd of wealth flowing past them there might perchance be the one good Samaritan of their life time, who, stopping for a while, would anoint their wounds of poverty. Yes ! it is true such poverty is unknown here. The poor man here may parade his poverty, proclaim his hunger, select his work, and criticise his victuals. Yet with all this, poverty being but a relative term, he is poorest in his own estimation who never knew a poorer, and it is in such a sense that poverty exists amongst our rural population. None starve I assert, but many have to do without the means of procuring comforts, humble indeed, comparatively speaking ; in this they are poor ; and it is but sophistry to tell them that there are poorer elsewhere. The toothache is not abated by being informed that the stomachache is greater ! So we must admit the poor therefore into any system that would be available amongst the rural population in considering any question of medical aid for the latter.

The questions that are about the most prominent in any such considerations are :—effectiveness, expense

and imposition. The first that it should meet the demand ; the second that it should not impose new and in such shape always hideous expense upon the taxpayer ; and the third that only the deserving should be brought within its limits.

As regards the first question, that is, what is at present done for the free rural population as regards medical aid, I regret very much that such an important question should be capable of receiving an answer commensurately unsatisfactory to its importance ; and that is, practically speaking, that nothing at all is done for it. It is quite true that medical aid is brought into their very midst, practically speaking brought to their very doors ; but, to be candid, we deserve no thanks for this, because it is more or less a contingency that can't be avoided in the system of medical aid that is part and parcel of the Immigration system of the colony. This mixed blessing of such possible medical aid is guided by no system or organisation for the free rural people ; and my experience has led me to find out that, whatever legal obligations may be pigeon-holed or held in reserve, making it *incumbent* on responsible parties to procure such assistance for the sick, the fact is indisputable, that there are too many large meshes in the net of responsibility, as it is at present, through which such parties may derisively pass.

Ignorance, improvidence and sickness, are three Gorgons standing in the way of the people doing anything for themselves or rather for those immediately about them, in times of need. On these people the occasional admonition of persons whom their suspicion leads them perhaps to suspect of self-interest,

is entirely lost, just as much indeed as advice to a child to *take* some nauseous physic that might be placed in its vicinity and not actually given to it. Their improvidence is proverbially too true, and to most of them sickness drags early in its train a condition of actual insolvency, soon attended by the effects of destitution. Medical aid is usually then only sought too late and with the somewhat morbid view of obviating a Coroner's enquiry ! For these poor people are quite aware of the solicitous attention that is bestowed upon them in *this* matter at a comparatively ridiculous outlay of money, which we would all rather see spent in giving a man what he needs when sick, than in making sure of what he died !

Then we come to the effectiveness of the rural population. Sickness is the great weakener of such effectiveness. A sick man is not only an incubus, but he is possibly an unprofitable expense, for the earning power of each man is deservedly an important question in the economy of the rural people. The earning man gives and takes. He is a profitable unit, and besides all this he is often the material support of others ; so that it becomes a state question that he should be cared for medically. I propose, therefore, in answer to the question, " what might be done," to place under different heads, numerically, a somewhat comprehensive and elaborate system.

I. In each medical district, there should be placed in certain localities relieving officers, whose duties it should be to become acquainted with the circumstances of the persons in their division, and thus be enabled when called upon to report upon the ability or otherwise of persons seeking medical aid and

comforts to procure the same themselves. Medical comforts, by which I mean proper and nourishing food, should always be provided by the relieving officer upon the order of the medical officer; and the enquiry, regarding the ability of the parties to pay for such should be left to subsequent proceedings, resorting if necessary to the jurisdiction of the Magistrate.

II. It may naturally be presumed that much abuse of such a charitable undertaking would ensue; but if such were properly guarded against by the appointment of, say, the clergy, magistrates and estate managers of a district, as the only persons who would be authorised to issue tickets for medical advice or visits, I consider that in this way, and with the services of the relieving officer as a check, and also the occasional meetings of the above classed gentry as a kind of Medical Relief Board to report progress and examine returns etc., any abuse would thereby be minimised and use augmented.

That such a change might carry with it no injustice to medical officers, whose duties would thus be vastly increased whilst their earnings would be proportionately decreased, I would suggest that, in lieu of such private practice as this would destroy, they receive a fixed sum in exchange. To take this district as an instance, about £200 per annum would be a low remuneration considering the extensive villages, increased responsibility, and the excessive medical attendance and duties that would unquestionably arise. I am quite aware that the financial aspect of such a suggestion is a serious difficulty, but this possibly might be overcome by some form of individual tax. I am confident at the same time that such a proposal would be strongly opposed by the Executive in

remembrance of the unpopularity and almost complete failure of the Poll tax ; but this would differ very much from that tax which was collected to be placed to the general revenue. This tax I suggest would be purely local in all its bearings, and would be expended in visible and immediate returns to the parties from and amidst whom it might be collected.

The Medical Relief Board above referred to, might be the treasury for these sums, the present local Poor Law Board perhaps being capable of conversion into such a body, and responsible through the Surgeon-General to the Executive for all its transactions. Probably I may be permitted to make a rough estimate of a district by calculating for about 3,000 free persons ; and estimating even at such a mild figure as a penny a head per week, it would return about £600 (a little over) per annum, which might be directly expended in the locality, as follows :—

Medical Officer	...	...	...	...£200
Medical Comforts and Medicines	...	...	...	200
Relieving Officers 4 at £25	...	...	...	100
Trained Midwives & Extras	...	...	...	100=£600

There is, I beg to say in support of this paragraph, no originality on my part in this suggestion, for we find in the county cess and poor rates in the divisions and counties of the United Kingdom a somewhat comparable system. The form of assessment possibly is different, but the *object* is the same ; and I should say that, as regards the idea being considered unconstitutional (whatever that may mean), it would be no more so than allowing private Medical (Incorporated) Aid Societies, but would instead have every argument in its favour by being under the guidance and protection of the Executive. As regards

Registration and Vaccination, it is almost impossible to leave these matters out of question in any consideration such as this paper refers to ; and indeed they may be handled together as being properly inseparable. Registration as conducted in the country localities at present is *not* effective ; and vaccination, without officers to enforce the compulsory feature of such a blessing, is evaded, neglected, and ultimately almost forgotten.

I would therefore suggest that the Medical Officers be the Registrars, in their respective districts, receiving the legal fee for each record.

The Relieving Officers to whom I have before referred, should be the prosecutors under instructions from the Registrars i e., the Medical Officers, for vaccination being neglected, and should receive, in order to encourage their energy, a portion of each fine imposed for such neglect. I would further consider that females might be encouraged to undergo a system of training in the Maternity Ward of the Public Hospital, and when qualified sent out to the various districts and paid for each case attended, some distinction being made in the cases of still-births. Women so trained would be in a position to call the Medical Officer if necessary, often perhaps thus obviating what is commonly called a still-birth, and otherwise assisting at and taking charge of ordinary cases, which, from the want of such attention, might otherwise become serious. Such a provision would supply a much needed want in most districts.

With a view to furthering the sanitary existence of the communities in rural localities, it is most urgently necessary that there should be erected at suitable places in all villages, such as churches, school houses, ranges etc.,

large vats or tanks for the collection and storage of pure drinking water. The relieving officers should be responsible in the dry season that there be no waste; and a suitable fine in the Magistrate's Court might be inflicted on persons guilty of any waste, the relieving officer being rewarded by half the fine as in the vaccination suggestion. I feel convinced that the pure water would convey with it an inestimable blessing to the community, and that many diseases, especially amongst children and constitutionally weak persons, would be much reduced both in severity and in frequency of occurrence. Other sanitary work might follow such an organisation, such as the cleansing and the proper drainage of villages, and matters of house hygiene and village conservancy. Each and all might receive such attention as they demand. The present vote for the upkeep of the villages might be drawn upon to effect this, and the relieving officers referred to in this proposal might be the present village overseers.

In view of such a system I would propose that neglect to seek early medical aid be reckoned as an infringement of the law and capable of being recognised as a criminal offence.

The foundation of some of these suggestions may be found to exist to a certain extent in the system of medical relief afforded under the Local Government Board at home, which, I am certain, for effectiveness of organisation, and the attainment of its object, is unsurpassed by any other similar system. I have worked under this board as the responsible medical officer in a district of about 20,000 persons, and I can assert with some amount of confidence that the system is *not* Quixotic

in its good endeavours. I am quite aware that the scheme as portrayed above by me may be compared to a measure of tares and grain combined ; but I offer it with a sincere desire that any good points may be considered, and, if applicable, adopted.

Actuated by the idea that there might be insurmountable difficulties embodied in such suggestions as the above, I drew attention again during the early part of the present year to the condition of the free rural population as far as my own district was concerned, by addressing an official letter on this subject to the Surgeon General ; and therein I drew out a less elaborate scheme of medical relief, which scheme I may refer to here by quoting from that letter as follows :—

“ I do not assert that medical attendance is beyond the reach of these people, but as it is at present, constituting seldom more than a prescription together with advice, it can in my opinion only by a stretch of the imagination be considered medical aid.

“ The importance of the proper and quick application of a blister needing perhaps the shaving of the patient's head, the useful manner of applying a hot poultice or fomentation, the prompt giving of an enema, the regular administration of such remedies in the way of medicines ordered, and the preparation of light and nourishing food, are all subjects which naturally are outside the radius of persons whose existence and mode of life render such topics foreign to them ; for the hand that prepares *foo-foo* best may indeed be poorest in ministering at the sick bed. Such matters are almost beyond the understanding of the general rural population comprising as it

does mixed races with different languages, ideas and modes of life. It is not beyond my experience to have become aware how medical instructions may sometimes be misunderstood, by learning of the assiduous efforts of a poor coolie man to encourage his poorer wife to eat all the linseed meal that he had mixed with warm water, or, in his opinion, cooked, according to instructions, misinterpreting however the mode of administration. Such experiences, sad though they may be, are probably inseparable from the nature of the circumstances surrounding these people, at least in so far as their medical aid is concerned ; and I am fully aware that the difficulties of combating those circumstances by any quick and generally popular system or method of medical aid may be assigned as the cause of their continuance. To obviate this and to bring such medical aid to these people as their present condition demands, is the object which I have in view in this letter and beg herein to submit.

“ I would suggest that the free rural population have extended to it such medical aid, as, bearing in mind its nature and mode of living, would be suitable and I trust successful. Such might be recapitulated under the following heads.

“ 1. Encourage the opening of sound apothecaries' shops under the supervision of the district medical officer, subsidising a qualified dispenser or sick nurse to reside therein to sell medicines, upon the medical officer's order or prescription, almost if not entirely at cost price. Further make such dispenser or sick nurse assist the sick in every manner, under the instructions of the district medical officer, in and about the locality wherein he might reside. Let there be such a dispensary in

every village. They might also be advantageously used as vaccination stations, and as the places where persons about that locality awaiting the medical officer might assemble. The dispenser referred to might further be engaged in finding out instances of sickness which were being neglected or empirically treated.

" 2. Enter into some agreeable arrangement with the Estates' Authorities either for the Executive to take over the present estates' hospitals or for the authorities thereof to extend their hospital comforts to the sick of all classes who might go therein or be sent thereto by the district medical officer. In this latter arrangement the Executive should of course pay some reasonable fee in the instance of poor people so as to cover expense of food, medicine etc., for each person so sheltered and aided. Parties capable of paying for such themselves should be called upon so to do.

" I consider the economy of such a suggestion must commend itself in comparison with the village hospital proposal; and any how it would be a practical means of ascertaining how far the free rural people are inclined to avail themselves of hospital accommodation in times of sickness. The village hospitals might follow if such an experiment, as above suggested, proved that there was a demand for them.

" I further consider that no licence should be necessary for an estate's hospital to sell medicine upon the production of a medical officer's prescription.

" 3. Above all I would urge the great necessity there is amongst these people, from a sanitary point of view, of ensuring pure drinking water for all both in sickness and in health. My experience would lead me

much to prefer to see the village tank or vats erected prior to the village hospital ; as to the former there need be no question as to their usefulness or popularity if erected. A bountiful Providence would fill them with pure water, and such a reward might then be anticipated as the gratitude of a healthier community.

“ These suggestions are offered with no desire to criticise other proposals ; and much less have I any desire to support my own views dogmatically. I am urged to such proposals by the conviction that “ The health of the community is the Supreme Law,” and how to assist in either maintaining or furthering this law is my desire.

I consider these proposals need but the guiding hand of the Executive to give the free rural population such a measure of medical aid as it sorely needs. More, much more, is advisable ; but that which lies at our hands, let us give. It can be done at the least cost and with the least delay ; and in this light the proverb becomes an axiom that “ *Bis dat qui cito dat.*”

Having now touched upon the two first questions as to “ what is,” and “ what might be done,” it only requires a very few words to consider the “ what should *not* be done” question. The construction in various localities of village Hospitals, has many advocates ; and it is a question deserving of the very gravest consideration. I introduce the subject here because it is one of the things which I think at least questionable as to its ultimate effectiveness, and as to the amount of medical aid it would really give to the people. There are many reasons why I entertain doubts as to its usefulness. There is no doubt that, in many of the chronic maladies, such hospitals would give shelter and medical comforts

to some so afflicted; but this I am sure would not be the only object of their construction; and in the sicknesses most affecting such a class as the rural people, I doubt indeed if the patients would be disposed to leave their homes. Thus it is quite possible that unless for the occasional sheltering of a chronic or itinerant patient, the village Hospitals would be most of their time empty. Again there are reasons connected with the prejudices of these people, that upon slight grounds, might make them object to the hospital; and thus such a contingency, as I have above suggested, might, through this latter cause, become a positive fact; and being an issue far from the intention of the proposers of such hospitals, it is, at least in my opinion, an event not to be entirely ignored.

By the idle and good-for-nothing class, found in all communities, the hospitals would be looked upon as a *dernier resort*; and with such an institution always staring them in the face with extended arms, I fear much that it would be but a means of increasing improvidence amongst such a class; and if these institutions saved themselves in the near future from the taunts of being but monuments of quixotic philanthropy, it might indeed be by their becoming little better than Alms Houses, studded over the colony—figurative milestones, as it were, along the high road of improvidence leading to the portals of the Castle of Indolence in Georgetown, otherwise known as the Alms House.


Amongst our legislators there has been a tendency, philanthropic it may possibly have been, but mistaken it undoubtedly was, to do everything for these people. Why I consider such an attempt to be a mistake, is that it encourages improvidence; for why need

a man lay by for a rainy day, if a paternal Government is ready upon such an occasion to step forward with an umbrella, and the obliging "allow me!" Whilst desiring to see in every way the strong right hand of help, advice and encouragement, extended to these people, one cannot help fearing that the emasculating philanthropy of such acts and ordinances coming in quick succession, may so reflect upon the people themselves as to leave them devoid of all self-help; and for our future philanthropists in this line leave nothing, beyond the distribution of automatic back-scratchers, to be done, eventually, for a people who will thus have been educated to wait and expect to have everything done for them—thus reversing in every way that healthiest of economies amidst communities which encourages the best energies of manhood, and proves in its wholesome ambition for independence to be the safeguard of the people while ensuring their greatest happiness.

Medical advice should be easily obtainable; medicines and comforts easily procurable; the assistance of a qualified dispenser and midwife easily accessible; and the sanitary conditions of the people primarily considered. But against treating or legislating for the free rural population as a community of paupers, I appeal; and I trust that the instinct of a just pride and self-reliance has not, amidst all the help they have received, been so far helped out of them, but that the honest working man or mechanic would even himself appeal against such degradation as would legislate for him and his descendants for ever in the category of *paupers*! Fifty years of freedom *must* have done more for our free rural population than to leave them thus.

The Zoophytes.

By the Editor.

HE group of the Zoophytes, or the Animal-plants of the old naturalists, is, as will be seen further on, but barely represented in the Fauna of British Guiana, where the conditions of life are unsuited to their development, yet the type of life is by no means unfamiliar, since in nearly every decent home is to be found the valued product of a Zoophyte's life, a product brought, it is true, from some more favoured district.

The familiar sponge, so widely used, and so highly appreciated, both in health and in disease, as well as in the arts and manufactures, is but the intricate framework or skeleton of a Zoophyte, which thus passes an existence, that, however humble it may be, is yet fraught with a great deal of practical interest. The precious or red coral of commerce, so generally made use of for necklaces and other ornamental objects, also claims a share of practical interest for the group of the Zoophytes; and these again, from a very large number of island residents in the tropical seas, deserve a very considerable amount of attention, since the very land on which their homes are built, and from which a great amount of their food is derived, has been accumulated on foundations in great part built up, and almost wholly made visible above the surface of the sea, by the work of various forms of these humble organisms.

To the philosopher and the biological student, more especially, the contemplation of the structure and the relations of the Zoophytes is one that teems with absorbing interest, since the typical stage of development that is here permanent, is a transitory stage in the development of all the higher animals, and presents us with the connecting link between the primitive unicellular condition of the lowest forms and the complex aggregates represented by the highest. As a unit, so to speak, in the evolution of the higher forms, the Zoophytic plan or type of organisation, is one that is most easily recognised, and, being of universal occurrence, one that is of material importance.

The term "Zoophyte" is still often applied in a very vague and unsatisfactory manner to include not only the animals thus properly designated, but also a very large assemblage of more lowly organised forms such as the Animalcules (*Protozoa*), and of more highly organised beings such as minute molluscs, worms, and other creatures, besides many undoubted plant forms. Scarcely more than a century ago, these forms, apparently destitute of the manifestations of life characteristic of the higher animals, were regarded as of a distinctly vegetable nature with animal affinities, which caused them to be regarded as intermediate between the two kingdoms; and the history of the patient and elaborate researches by which their entire animality was brought to light, and of the persistent and violent opposition with which such a conclusion was met by the leading scientists of the time, forms one of the most interesting and suggestive chapters of attempted scientific dogmatism.

The modern fundamental conception of a Zoophyte, is a growth composed of lowly organised animal forms which have budded or grown one from another, and have remained organically connected with each other to make up a more or less plant-like colony. The most typical Zoophytes, as considered by the older naturalists, were organisms of this kind ; and this gives a sufficient justification for the restriction of the term " Zoophyte" to those related animals in which, while the typical colony is essentially plant-like in form the parent or individual beings, which make up the colony, consist of a simple bag-like body usually furnished with radiate grasping organs, or *tentacles*, around the open end—beings which thus present a somewhat flower-like aspect.

This bag-like body is never unicellular, and it is thus unlike to, and higher in organisation than, the typical forms of the Animalcules, but it consists chiefly of two distinct layers of cells, or separate minute masses of protoplasm or albuminous substance, an inner and an outer. The outer layer of cells, always in intimate relation with the fluid medium in which the Zoophyte lives, is the seat of all sensation and motion ; while the inner layer is the seat of the digestive functions, and lines the hollow of the bag which here takes the place of a stomach—the open end of the bag, usually surrounded by a circlet of arm-like feelers or grasping organs provided with stinging cells, serving as a true mouth and also as an aperture for the discharge of refuse matter.

All the Zoophytes are capable of being reduced to this structural plan, the colony being simply aggregates of this type, its form being determined by the manner

and amount of budding or branching where this development takes place. The term "Zoophytes" is thus the popular designation of the group of animals which, from their simple bag-like cavity, are technically known as the *Cœlentera* or Hollow-entrailed animals.

Considerable modifications of this plan, however, take place among different members of the group, and tend to hide the structural simplicity of their organisation. Among the sponges, the grasping organs are absent from the mouth, stinging cells are never developed, and the walls or sides of the body become so perforated that the colony forms a variably shaped porous mass: among the coral class, the lower part of the bag becomes divided up by vertical partitions where usually a calcareous deposit—coral—is formed; while in the jelly-fishes, the body as a rule is vastly swollen out by gelatinous matter, and the bag-like structure is thereby almost obliterated.

In the greater number of forms, a third or middle layer of cells, developed from the outer layer of the body, is clearly indicated, and in the sponges especially, becomes markedly abundant. Nerves and muscular fibres developed from this layer, and thus primarily derived from the portion of the body in contact with the outer world, are here met with in their simplest condition, and present themselves as isolated and scattered patches or threads, very unlike the cord-like and band-like tissues of the higher animals. No rudiments of a distinct circulatory system exist in any of these organisms, but the nutrient fluid elaborated by the inner cell-layer, passes throughout the whole body from cell to cell. In the colony-building forms, however, as the various parts are organically connected by the stem-like

portion, where the central cavity of each individual is continuous throughout with that of every other form, the nutrient fluid elaborated from the food material by any one individual, mixes throughout the whole system for the benefit of all; but this, though it insures a circulation of the common fluid throughout the colony, is by no means comparable to the distinct circulatory system of any of the higher types.

In very many of these colonial forms, a most wonderful specialisation of function, accompanied by a corresponding modification in structure, has taken place among the various individuals of the colony, by which certain buds or individual forms, comparable to a battery of stinging cells, perform the functions of grasping organs, being thus set apart for defending the colony and for seizing food; while other forms, of much larger size, receive the food thus provided, and digest it for the common good—an adaptation to a division of labour, that, in relation to the lowly organised forms amongst which it obtains, is perhaps unequalled even by the complex associations of human civilisation.

Though the most characteristic forms of the Zoophytes are those that take on the colonial habit—a habit due to the continuous budding or branching of the parent or individual organisms to form other beings which remain attached to each other—yet a considerable number of forms exist which lead a simple life and never give rise to colonies; and these simple organisms are to be found in each of the three groups, the Hydroids, the Sponges and the Corals, into which the Zoophytes are divided. The little *Hydra* or Fresh-water Polyp, a form that presents the typical bag-like body with arm-like feelers

around the open end, is essentially a simple organism, though the buds produced during growth often remain attached for some time and indicate the colonial arrangement. The colony-forming Hydroids are essentially simple aggregates of such Hydra-like forms which have budded continuously to form little bushy growths, in which the separate buds bear a considerable resemblance to flowers on a plant.

Among the sponges, the various buds or branches produced by the parent form sometimes remain distinctly noticeable; but usually this condition is entirely lost, owing to extreme budding and the fusion of adjacent parts, coupled with the development of a very large number of pores throughout the body substance, which more or less hide the primitive arrangement of parts and give the open or porous texture characteristic of the familiar washing sponge.

Among the group of the Corals, the Sea-Anemones are simple forms; but, in those that form colonies, the plant-like aspect is carried to an almost extreme point, as in the various kinds of Tree-corals, though many forms, instead of producing branching colonies, give rise to hemispherical or globular masses, which, owing to the close approximation of the little star-like animals composing them, resemble huge heads of flowers. These little star-like coral-forming beings, which, in the tree-like masses, generally stud the surface throughout and give the appearance of a mass of flowering axes, are in structure almost exactly the same as the beautiful Sea-Anemones that are so abundant along the rocky shores of temperate climes; but the Sea-Anemones, like the little fresh-water Polyp among the Hydroids, never

form colonies, nor do they deposit hard structures like their coral-forming relations. From the structural simplicity of these beings, it will be seen that a more inaccurate term than the popular one of *coral-insect*, could hardly have been applied to these organisms; and the term is moreover a senseless one, since, apart from the fact that the coral-polyps have no direct relationship whatever with the insects, there is not a vestige of resemblance between the two types, either in their external form or in their mode of life, to give in excuse for the application of the name.

Throughout the group of the Zoophytes, the growth or increase in size of a colony takes place by the continuous development of other individuals from the component polyps, either by their division into two, or by the production of buds around them; but the increase in number of the colonies depends upon the production of true sexual elements, except in those special cases where, by mechanical means, a detachment of the buds or rupture of the branches takes place, in both of which cases fresh colonies develop from the detached pieces. In the little fresh-water polyp or *Hydra*, as already noticed, the buds produced normally separate from the parent form, but, in addition, true sexual elements are developed in the form of special buds, at certain times; and in the closely related colonial forms, in which the individual feeding-polyps are essentially nothing but specimens of *Hydra*—and hence on this account known as the Hydroid Zoophytes—corresponding special buds are developed for the production of the sexual elements.

One of the most striking instances of a marvellous series of phenomena, prevalent both among plants and

animals, and most markedly so in the generality of the lower forms, is to be found among the Hydroid Zoo-phytes. In many of these organisms, the special buds developed for reproduction do not remain attached to the fixed, plant-like colony, but drop off and lead a free-swimming existence, and increase considerably in size ere the sexual elements are developed. These free-swimming sexual organisms take the form of hemispherical or sub-globular bells, richly coloured, transparent and glassy ; and from the centre of the circular rim the true mouth hangs below like the clapper of the bell, while the edge of the gelatinous mass is fringed with a variable number of ribbon-like streamers, charged with stinging cells. They are variously known as jelly-fishes, sea blubber, sea-nettles and medusæ, names derived either from their composition, form, or stinging properties ; and though they are generally noticed in the ocean as floating inert masses, yet owing to the contractility of the bell, they are able to propel themselves with considerable rapidity through the water. These beautiful bell-like beings, apparently so different from a Hydroid polyp, were classed as widely separated organisms by the older naturalists to whom the history of their origin was unknown, but with the gradual extension of knowledge, it has been shewn that they produce eggs which develop, not into other jelly-fishes like themselves, but into fixed Hydroid polyps like the individuals of the colony from which they originally were detached. The resulting fixed Hydroid polyps by continuous budding give rise to new plant-like colonies, and these in turn produce reproductive buds which become detached and go through corresponding cyclical changes.

This curious alternation of generations, a phenomenon perfectly distinct from the early embryonic changes of the organism, finds a very close parallel in the Vegetable World among the ferns and allied plants, where the familiar leafy growth, like the plant-like Hydroid colony, is destitute of the power of producing sexual elements, and produces instead an asexual generation in the form of minute buds or *spores* (generally to be noticed in groups on the back of the leaves or fronds), which fall away and produce, under suitable conditions of temperature and moisture, a leaf-like expansion on which the true sexual elements develop; and these sexual elements give rise, not to a leaf-like expansion like that on which they were produced, but to the common leafy plant which again starts the asexual generation of the series.

In connection with the jelly-fishes, it is a curious and noteworthy fact, that several forms, and these among the largest, are known which have no Hydroid stage, this condition having evidently been lost; so that here the sexual elements of the medusa give rise to other medusæ in direct succession.

The hard or skeletal tissues of the Zoophytes are considerably varied, and take on one of three chief forms according to the special group in which they are examined. In the group of the Hydra-like animals (*Hydrozoa*), among the plant-like Hydroid Zoophytes, with the exception of a few forms having a calcareous skeleton covered by a fleshy layer, a horny deposit covers the greater part of the colony, extending at the base as well over the rootlike filaments which fix the growth to foreign objects, as over the stem-like portion as a sup-

port, and generally opening out beneath the individual polyps in the form of small cups, in which the little beings reside, and over the sides of which they can expand themselves with a striking resemblance to fragile blooming flowers, thus increasing their apparent similarity to plants. In the group of the Sponges (*Spongida*), the body mass or colony is not covered externally with hard structures, but throughout the soft substance an abundant skeleton extends either in the form of united horny fibres or in grouped bundles of calcareous or siliceous needles or *spicules*; and this skeleton is sufficiently firm to preserve the form of the colony after its death and the decay of its soft structures. Lastly in the group of the Corals (*Anthozoa*) a more or less massive or branched skeleton, or coral, is present beneath the outer fleshy layer by which it has been deposited, and continuous with the soft bodies of the star-like polyps which make up the colony. In all cases, these skeletal tissues of the Zoophytes are the only parts that survive after the death and decay of the colony; and they give no idea whatever of the structure of the little soft bodied beings by which they were produced. The sponges of commerce are thus but the bare supporting framework of what during life was the true sponge colony.

Throughout the greater part of the world, the observer by the sea has within his reach a boundless variety of these strange and beautiful forms of life. They inhabit the shallow waters either floating, conspicuous in their radiant colours, on the bosom of the sea, or nestling like fairy flowers in the recesses of some sheltered rock-pool, or spread out like a gay parterre on the gentle

slopes below the reach of the tides. The floating forms are the familiar jelly-fishes, while the immense variety of the fixed colonies, bear the names of objects which they resemble in miniature, such as sea-fir, sea cypress etc.; and while those with harder and firmer skeletal parts are generally distinguished as corals and sponges, the smaller and more delicate Hydroid Zoophytes are commonly taken for and ranked with sea-weeds.

Though of a very simple grade of organisation, yet the Zoophytes play a considerable part in nature. They furnish continuous supplies of food to a very large number of marine organisms; under the form of sponges, their skeletal tissues are of considerable practical importance and form the basis of a very extensive industry, while the abundant formations of coral both in ancient geological times and in the present day, give a special significance to the task assigned to them by Nature, in the building up of sub-marine peaks and their transformation into terrestrial areas, which in time become suitable for the support of the higher forms of animal and vegetable life—a task which has resulted in the production of numerous inhabited areas situated in the tropical portions of the globe.

The Zoophytes are typically marine organisms, though many forms are to be found in brackish water, and a few have entirely taken up their abode in perfectly fresh water. Of these last, the common Fresh-water Polyp (*Hydra*), the rare and unique Fresh-water Medusa (*Limnocoelum*) lately discovered in the tank of the *Victoria regia* in the Royal Botanic Gardens of London, and the Fresh-water Sponge (*Spongilla*) may be men-

tioned. The various forms of coral or coral-like animals are strictly marine; but a few species, which inhabit the estuaries of rivers, have become adapted to more or less brackish water, and flourish therein.

The Zoophytic range is almost unlimited, spreading from the icy poles to the Equator, and from the surface to the abysses of the ocean; and while special forms are characteristic shore or surface organisms, others are only known from considerable depths, often reaching to many hundreds of fathoms. For the Zoophytes, however, as for all other groups of marine organisms, the zone of greatest development lies along the superficial area, from the surface to a depth of about thirty to forty fathoms, where the conditions of life, such as presence of light, a moderately high temperature, and abundance of food, are most favourable. In one great group, that of the reef-building corals, the zone of life itself is still more sharply circumscribed, since the limit is practically reached within 30° north and south of the Equator, where the minimum temperature at a depth of thirty fathoms is about 68° F. Purity of the water and freedom from mud in suspension, are almost essential conditions for Zoophytic life; and scarcely less important than these is the condition of the water as regards its salineness, since a discharge of large quantities of freshwater from large rivers, exercises a marked deterrent effect on the development of these organisms. In the prevalence of unfavourable conditions such as these, viz., large quantities of mud in suspension and on the shore bed, and the discharge of immense quantities of fresh water from the rivers, must be sought the explanation of the

almost entire absence or the very great rarity of Zoophytic life in Guiana.

So far as at present ascertained, the fresh water Polyp or Hydra, is the only denizen of the fresh-water canals and trenches, though it is to be expected that the fresh-water Medusa will some day be obtained, since it has hitherto only been observed in Europe in hot-house tanks that contain the *Victoria regia*. Probably the fresh water Sponge will also be discovered in Guiana, since spongy masses are said to be found on rocks in the higher parts of the rivers, in positions that would be favourable for their existence. No true coral forming Zoophyte or sea-anemone, has so far been met with on the Coasts of Guiana, and it is extremely unlikely, from the nature of the water, that such forms exist here.

One marine Zoophyte, however, and that one of very special interest, occurs in considerable numbers on our coasts, namely, the well-known and widely distributed oceanic jelly-fish, the Portuguese man-of-war (*Physalia*)*

This Zoophyte is found floating on the open sea, and often at the mouth of the river. It is extremely conspicuous owing to the vivid tints of red, purple and blue which play upon that portion of the animal which pro-

* It is perhaps advisable to point out here, that, in DALTON'S History of Guiana Vol. 2, page 325, by some incomprehensible slip, the Portuguese man-of-war has been confounded with the conspicuous paper Nautilus (*Argonauta argo*), which is one of the members of the class *Cephalopoda*, the highest group of Molluscs. The lowly organised Zoophyte, the Portuguese man-of-war, not only has no affinity whatever in structure to the highly organised Nautilus, but there is not even the faintest resemblance in form; though, owing to the brilliance of their colours, seen from a distance floating on the sea, the two forms could with difficulty be distinguished.

jects above the surface of the water, and which portion generally takes the form of an air-bladder transversely grooved, drawn out nearly to a point at both ends and with a strong crest or keel along the entire upper portion. From the under side of this float depends a very variable number of more or less tubular parts which together make up a colony comparable to a plant-like colony of Hydra-like polyps, but one in which the various individuals have been modified to fulfil very different functions for the common good. Thus certain parts are feeding polyps, furnished with a mouth leading to a simple bag-like cavity or stomach; others are more or less protective, and serve to cover over the feeding individuals; while others again, which are extremely elongated, often several feet in length, and are abundantly provided with stinging cells, serve as grapnels and offensive and defensive weapons. It is these line-like tentacles alone which possess the disagreeable stinging properties so characteristic of the Portuguese man-of-war, a property due to the presence of minute cells provided with a coil of fleshy threads tipped with a poisonous barb, which, on contact of the body with any foreign substance, is violently darted out. As experience shows, and as the structure of the parts indicates, the float and the shorter depending parts may be handled with impunity, but the long grapnels may not be thus handled, since the attempt is accompanied by a most acute and long-lasting irritation and pain. Hidden in among all these parts will be found others which are concerned simply with the production of sexual elements for reproduction.

By many writers it is stated that the air cavity of the float communicates with the atmosphere, and that thus

the colony is able to sink or float according as the air-bag collapses or is filled with air. This, however, is a mistake ; the air-bag is permanently distended, there being no communication with the outer air ; and even when the colony is altogether disorganised, and cast, dead, upon the shore, the float still remains distended with air.

With the exception of the length of the stinging tentacles, the size of these Zoophytes is never considerable, the length being on an average about 6-9 inches. In this respect, these organisms are inconspicuous ; but as regards delicacy of form and beauty of colouring, they are incomparably beautiful. The transversely grooved surface of the float gleams with a most delicate sheen of changing red, violet and purple, and its opalescence and iridescence transcend all description. The Portuguese man-of-war is indeed a thing of beauty ; but alas ! it is *not* a joy for ever, since, out of its own element, its loveliness *decreases*, and all attempts at preserving its fleeting colours are about as successful as such attempts would be with a gorgeous, glistening soap-bubble.

What the state of Zoophytic life in Guiana in past ages may have been, there is no evidence to show : what it will be in the future, is equally impossible to arrive at ; but this we know, as set forth above, that under present conditions, it is barren in the extreme.

Seven months up the Puruni River.

By H. I. Perkins, FRGS, 1st Government Surveyor.



LEFT Georgetown on the sixth September, 1887, for the purpose of surveying placer claims in the Puruni, and on the morning of the 17th reached the surveyor's camp in the district. The journey was somewhat protracted, since I was detained for three days at Bartica Grove waiting for a crew, and from the fact that the men, the greater number of whom had evidently been imbibing freely of rum, beer and various other rum-shop abominations, were unable at first to paddle or haul the boat through the rapids for any length of time continuously. The weather was favourable all through the voyage, and the trip had been a fairly pleasant one, but for the intense heat at midday in the Mazaruni, when the sun shone with pitiless force.

The river at the time, owing to the drought, was low, so that at the rapids large masses of rock usually covered with water when the river is in full stream, stood out bare and naked, and reflected the heat to adjacent objects; and as the boat, before ascending a fall, approached close to the rocks on either side the channel, the sensation was like that experienced on nearing a furnace, the hot glow from which dried up one's juices and induced a feeling of exhaustion and faintness. It was refreshing at times to soak one's hat in the river, and to pour water over one's head; but the boat hands were to be envied, for they were at frequent intervals in

the stream, dragging the boat over the submerged rocks, and able to immerse themselves entirely in the cool water.

Though I paddled, whenever possible, all the way from Bartica to my camp, to relieve the monotony of travelling, it did not seem advisable to attempt any water work, for I had seen the effects of like exertions on three white men, who subsequently had paid dearly for their temerity—one of them, in fact, nearly dying from fever brought on by the sudden change, and the shock to the system caused by plunging into the cool river whilst in an overheated state. In the Cuyuni River, earlier in the year, this same cause gave dysentery to some of the men employed in the Surveyor's boats, of whom two died whilst away in the interior, and one after his return to town.*

The Puruni river being narrower than the Mazaruni, one escapes the intense heat of the sun, since frequent opportunities occur of sheltering in the shade of the trees along the banks, of which the boat captains are only too glad to avail themselves after the glare and heat experienced in the wider river.

Of pacu (*Myletes pacu*) which are most abundant and most easily procurable when the water in the river is low, we got none, though one energetic boatman frequently insisted upon arming himself with a bow and

* The remedy used by some bovianders for dysentery, which appears to be more prevalent in the Cuyuni than the Mazaruni or Puruni Rivers, is the fruit of a tree known as the Saparoa, which grows plentifully on the rocks and islands near the rapids in the Cuyuni and Mazaruni, and in one or two places in the Puruni. It is by no means a sovereign cure, however, as the above mentioned victims of the disease found to their cost.

a couple of arrows and stalked ahead of the boat along the dry rocks and shallow channels to shoot fish.

The river people say with very questionable accuracy that the gold diggers' boats by their frequent voyages have alarmed the fish, which consequently have retreated into the tributaries of the Mazaruni; but it may more reasonably be supposed, not that the fish are less numerous than before, but that they are frightened from their usual haunts only while a boat happens to be passing near them. This is easy of belief, for some of the gold diggers' crews sing, splash, and altogether make a hideous noise when travelling up and down; and considering the great conductivity of sound in water, the noise must be sufficiently loud to be heard at considerable distances. At Kapurshi Mission Island, on my way down the river, I purchased a beautiful fish (*pacu*), quite 8 lbs. in weight, from the Indians, who, as a people, move and hunt almost noiselessly.

The surveyor's camp is pleasantly situated opposite the mouth of the Chinee Creek, about two days' journey up the Puruni River, and on its right bank. It consists of a small clearing in the forest about an acre in extent, on which stand four logies, or benabs, built of rough, round wood, thatched with the leaves of the manicole, (*Euterpe edulis*) and tooroo (*Enocarpus baccaba*). Two benabs were reserved for the use of the hands, one for a store, and the fourth for myself. On three sides of the clearing, the forest trees, untouched by the axe, towered far overhead, amongst them being some splendid specimens of the valuable hardwoods of the colony, greenheart (*Nectandra rodizii*), mora (*Mora excelsa*), tonka bean (*Dipteryx odorata*), coutaballi, moraballi, and several

soft-wooded, tall-growing trees, one in particular, a pumpwood or baramalli, just in front of my benab, being quite 140 feet high.

The camp opens out on to the river, at this spot about 120 yards wide, skirted on each side by the forest, which at various seasons, breaks here and there into masses of bloom—pink, red, orange, yellow and purple—borne principally by flowering trees and bush ropes, of which the last hang in graceful moss and fern-covered loops and bends from one tree to another, enveloping some of them in complete folds, and matting together their smaller branches and limbs. Over some of the trees too, a liana (*Norantea guianensis*) flings its sprays of flame-coloured blossoms mounting up in step-like stages, while others are covered by clusters of the purple *Petræa*, a very common plant in this part of the colony.

The days used to pass pleasantly enough, the monotony of life being broken occasionally by the passing of a boat carrying diggers to or from their placers, who sometimes sang as they paddled; and the cheering rattle of the paddles against the boat's side blended not unpleasantly with the song as the men's voices rose and fell, echoing far into the forest, and down the long reach of the river. As the boat passed close by the camp, inquiries would be shouted from each party as to how such and such friends were, and for how long they were up, or had been up the river; and after several "walk goods" and "stand goods" were exchanged, the boat would turn the point: and monotony once more reigned supreme.

Seated in my benab, I could hear in the forest around me the hum of insect life; while overhead, in the almost

impenetrable leafy mass, parroquets were busy feeding, chattering and quarrelling, dropping showers of half-eaten fruit to the ground to be presently devoured by the acouris (*Dasyprocta aguti*) which abound all through the country. At intervals too, sometimes near, sometimes afar, the deep knell-like note of the bell-bird, or campanero (*Chasmorhynchus carunculatus*), echoed over the sea of tree-tops or down the leafy aisles of the forest, more noticeable perhaps in the hottest part of the day, when the voices of other birds were for the most part hushed.

The river itself glided slowly by, every day becoming less, and bore on its dull greyish-white surface flecks of foam or leaves and dead flowers, disturbed now and then by the leap of some great fish darting after its prey; while swallows and other birds characteristic of the falls swept along to and fro in rapid flight above it. The great Kingfisher or Saxacalli (*Ceryle torquata*) is common here; and near Saporowa Island, half a day's journey from the junction of the river with the Mazaruni, the beautiful sun bird (*Eurypyga helias*) is frequently seen, easily recognised by its plaintive call and the splendour of its open wings during flight. Butterflies too were very numerous, the commonest a splendid insect of a brilliant, metallic blue (*Morpho*), measuring nearly 5 inches across its open wings, and resembling in its slow wavering flight a piece of bright blue satin carried along by some gentle breeze. In the evening, frogs of every variety of note, from the deep "Kronk, Kronk" of the bull frog to the shrill but musical cry of his brother batrachian of the trees, made the bush resound, beetles buzzed drowsily through the darkening air; fire flies and fire beetles

(*Pyrophorus noctilucus*) flashed like stars through the forest; and last, but in almost every sense the monarchs of the night, mosquitoes sallied forth in legions. My camp seemed to be a particularly favoured spot, since mosquitoes abounded during the whole time of our residence, although some little distance in from the riverside none were to be seen. A curious fact noticeable about the Elater beetles was the peculiar attraction towards a glowing, not blazing, fire to which they seem subject. A brilliant flame or tongue of fire does not appear to have the same fascination over them, for they would pass directly by a brightly burning duplex lamp and immolate themselves on the hearth, dropping into the centre of the glowing heat.

Turning out one night on an alarm of "Tiger" being raised, I found on the ground a luminous worm, which next morning proved to be the larva of a beetle, possibly this very Elater. It was preserved in Islay whisky and brought to town, and some day, perhaps, the genus to which it belongs will be satisfactorily settled.

A particularly large kind of mosquito was common near the benab, dark blue in colour, with the exception of the end of the body, where vermillion patches occur. These insects possess peculiarly long legs, and, when at rest, measure quite half an inch from the ground to the highest part of the body. Their humming is extremely loud, and is equivalent to the noise made by about ten ordinary mosquitoes. Another peculiar species of the same insect to be met with here, had its two hindmost legs thickened in the middle like the pollen-carrying thighs of a bee.*

* I have since seen a similar instance in the bush on the left bank of the Corentyne River.

Of other insects collected by me, an earwig nearly two inches long, and a giant cockroach, $3\frac{1}{4}$ inches long by $1\frac{1}{4}$ inches wide, took the honors. Two species of longicorn beetles were also common, as well as several varieties of spiders, with curiously shaped bodies ending in the most wonderful angles and bosses and points, some so brilliant to look at, that their bodies seemed to be fashioned of burnished metal. A curious sight to me was that of some of the more sombre-coloured spiders being carried off bodily from out of their webs by an immense species of dragon fly, whose bodies were sometimes quite $4\frac{1}{2}$ inches long, of a pale French-grey colour, having their wings barred with a dull orange.

Locusts, apparently identical with the species (*Acridium vicarium*) that ravaged the provision lands in Berbice in 1886, were numerous, as my small plot of garden plainly showed; and many branches and small twigs were noticed sawn off by the sawyer beetle (*Prionus cervicornis*), but no specimens of the insect were obtained.

Several nights in succession towards the latter end of my stay, I had to abandon reading and to put out all lights owing to the clouds of insects (*Ephemeridæ*) that swarmed round the smallest spark. So numerous were they, that in the mornings the river was quite white with their bodies; and earlier still, before the sun gained power, the flight of these swarms was so thick and persistent that it reminded me of a snow storm.

One of the most curiously interesting creatures observed by me, was a species of fly which frequently entered my benab: never more than one at a time, but the most sociable animal it is possible to imagine!

They were about half an inch in length, with long, slender, three-jointed legs, and with a predominant colour of a deep orange red. Sometimes while I sat reading near my rough dining table—made of two deal boards picked up floating in the river, and supported on four forked sticks—one of these insects would fly leisurely up to the spot, and then, as though to make itself at home, would run once or twice up and down the table and return to its place near me. It would then open and shut its wings, and perform the most extraordinary antics with its legs, which it manipulated so cleverly that they seemed to be arms furnished with hands. It first rubbed the two front feet deliberately together, as though in the act of washing them; then taking its head between these same feet, it turned it rapidly half round in one direction, and immediately after half round in the other. Then followed a second imaginary washing, after which attention was directed to the hindmost feet, which were taken up singly by the front ones, and carefully rubbed over as though the insect were having its boots polished. The thorax and back then came in for their share of stroking, the legs moving apparently in all directions and being perfectly articulated. To this a curious rubbing process succeeded, the front legs being crossed, and the body rapidly struck or brushed, much in the same manner as that in which an English cabman, on a cold day, may be seen beating his body with his arms to promote circulation of the blood. Its favourite action, however, was the raising and stroking of its two middle legs, done in the most methodical manner; while, as a resting position, it placed usually the right fore leg, straightened out stiffly on the knee joint of the other fore leg, to act, one might imagine

in the place of antennæ, or as a feeler to warn its possessor of the approach of danger. So tame or impudent were these insects that, on rising and disturbing them, they would not fly away, but would quietly walk off and perhaps rehearse their curious antics.

Though the camp was never troubled by "tigers" (*Felis onca*) distant noises attributable to such animals were often to be heard at night. A small ocelot to which chase was given, was once met with on an island in the Puruni, but it dashed into the water and made its escape into the forest.

The Indian huntsman of my party was a decided acquisition, for the larder was well supplied with fresh meat. In fact, I often experienced an *embarras de richesses* when he was more than usually successful. Several times did he bring powis (*Crax alector*), maam (*Tinamus*), douraquara (*Odontophorus guianensis*), maroodi (*Penelope marail*), land turtle (*Testudo*), deer (*Cervus*) bush hog or abouyah (*Dicotyles torquatus*), haimara (*Erythrinus macrodon*), and acouri (*Dasyprocta aguti*). All this fresh meat was an extremely pleasant change from the usual fare of bush travellers, viz., tinned meats and salt fish.

During the last three months of my stay, labba meat (*Cælogenys paca*), which is justly looked upon as the caviare of the bush, was fairly plentiful. This was due to a small black and white dog, belonging to one of the boat hands, which hunted labba excellently, sometimes killing four or five in a morning, and once even six.

There do not seem to be many Indians in the Puruni; but from some that stopped at my camp *en route* for Bartica Grove, I learned that about seven days' journey

further up the river there is a village containing forty or fifty inhabitants, and that there is a path thence to the north and north-west leading into the savannah, where there are several small communities, who travel to the Spanish or Venezuelan side and traffic with the miners at Caratal. This is probably quite true, for when travelling up the Cuyuni in April last year, I met a party of eight people in woodskins on their way to Georgetown, who had in their possession forty sovereigns which they wished to change into silver money. This gold, they said, they had obtained from the white men at Caratal in exchange for game and hammocks.

As a rule, the male Indian will not perform any agricultural labour such as tilling the soil. I have known of three cases only where the men would dig for gold, and in one the Indian was a particularly strong fellow, and worked extremely well, quite as well as, if not better, his employer said, than any black man.

I have often asked Indians if they have ever seen gold anywhere, or obtained it from the soil, and they have invariably either avoided the question or answered "no"; and I am perfectly sure they understood the meaning of the question, for where the men were ignorant of English I employed an interpreter. It is not easy to account for this singular reticence on their part touching a subject which might become a source of considerable profit to themselves. It may arise possibly from their disinclination to dig, and their total want of implements such as would enable them to dig successfully; or it may perhaps be caused by the remembrance, handed down to them by tradition, of the fearful sufferings experienced by their ancestors at the hands of the Spaniards, and no

doubt when they could get the chance, the old English too, who, imbued with the *auri sacra fames*, spared neither sex nor age in extorting the precious metal from these simple children of the woods, and in making them toil and dig in the fiery heat of the sun to satisfy their own lust of riches.

Stories have often been told me of Indians living in the affluents of the Mazaruni having been seen with nuggets of gold in their possession, pierced and worn as necklaces; but it has never been my good fortune to see anything of the sort. Before leaving the Grove for the Puruni River, I bought there a buck "goglet," or water bottle, made apparently out of the usual materials, and in the method common among the people at Bartica, which showed clearly on its surface, in the mouth where it was uncovered, minute spangles of gold, but quite large enough to be visible to the naked eye. I failed to discover whence the clay composing the vessel had been obtained, but certainly do not think the potter had any notion of the auriferous nature of the materials he used.

In the course of my work nearly all the placers in the Puruni and its tributaries were visited. Some of them were situated at considerable distances from the main stream; and to reach them necessitated long and tiresome walking over steep hills, across creeks and swamps, and rocks and tree-roots. Once in returning from a claim near the Mara-Mara Creek, we found that owing to the very heavy rain which had fallen, we had to wade chin deep with bundles on our heads through the water; and as part of the way led across a creek, also in flood, where the water was still deeper, and a fallen tree hidden by the flood the only means of crossing, it was at

once difficult and dangerous. One man indeed tried to cross on a tree leaning across the creek, but only succeeded in becoming fixed, bundle on head, midway over the swollen stream and unable to move backwards or forwards without assistance.

The placers or localities which have paid the best are those worked by the Messrs. CHARLES and LAWRENCE FORBES. The former is situated about three and a half hours' walk from the Puruni river-side, and has given nuggets weighing from a few penny-weights to several ounces. Much of the gold is coated with peroxide of iron and some quite black with man-ganic oxide of iron, and is obtained from a depth of two to ten feet from the surface. Mr. FORBES' claim is quite close to the river and furnishes fine gold, mostly small grains and not large pieces. The site looks as though the river had originally flowed over the land, and the course of the stream subsequently changed to its present bed.

The geological formation of the whole country, and the natural forces which have been at work there, are difficult to determine accurately. The country rock is gneiss, though quartz porphyry occurs at the Mara-Mara Creek, and granite in one or two places near the second and third falls. Through the gneiss the quartz ledges are interspersed, and here and there in the river, banks of quartz boulders may be seen when the river is low. Not far from the Essequibo Company's water-side camp a well defined quartz ledge 6 feet wide runs across the stream, but has not, I believe, been tested for gold. Beyond the Mara-Mara, about half a day's journey, a curious, friable, dark brown, clay slate is met with, and here

the rocks seem to have been less subjected to volcanic action than is the case immediately above and below. There is no doubt the country has been subjected at some period to an extraordinary upheaval, and large quantities of ironstone, both hæmatite and limonite, are everywhere met with, sometimes overlying the older igneous rocks and capping the more recent deposits, with which it is frequently intermingled. One curious feature to be met with in some of the placers, is the prevalence of lumps of conglomerate, in which are embedded many different kinds of rocks, the cementing principle being either silica or what looks like intensely hard, indurated clay. Out of one such lump I picked out a few small garnets and pieces of opalaceous quartz, as well as two or three small gold grains the size of a pin's head.

The very dense forests prevailing over the entire country, and the absence of cliffs in any place, or sharp escarpments, where for a depth of many feet the structure of the earth's crust could be seen in section, preclude any possibility of examining the rock formations; and the question of the existence in the Puruni district of auriferous quartz veins, whose exploration would be remunerative, cannot be superficially determined, but must depend largely on the striking of shafts and large outlay in machinery food, and labour.

There are no traces of glacial action such as furrows or polished surfaces to be found in the district; though, in the beds of many of the streams, quartz and other pebbles can be seen rounded and even covered with scratches, which look like striæ, inasmuch as they are mostly in the same direction as the line of their least resistance; but curiously enough fragments of the same

rocks are present also with their sides showing a sharp clean fracture as though quite recently severed from their parent rock, and bearing no traces of erosion or travel.

Nothing of the nature of erratic blocks are met with in the district. I certainly have seen two immense blocks of water-worn white quartz which struck me as being of this nature, near the Arapu River, while on the way to Roraima in 1884, and I hear there is also one such on the summit of Woka or Powis mountain in the Cuyuni, near Warire Creek. In the Tiger Creek too, an affluent of the Essequibo River, there is a huge obelisk-shaped mass of, I think, gneiss, which bears the appearance of having being conveyed thither by ice.

How the quartz and other rocks have been shattered and broken up can only be to a large extent a matter of conjecture. In a great measure the volcanic disturbances have contributed to this, and in addition it is necessary to take into consideration the effects of the alternations of temperature from the fierce heat of the noontide sun to the comparative cool of the evening, to which the rocks must have been particularly subject before the period when vegetation began to cover the whole country. In all our rivers where rocks are found in the stream beds and on their sides, huge masses of rocks, some of them several hundreds of pounds in weight, may be seen broken and riven by the change from heat to cold of the surrounding air, some broken in cubical blocks whilst others weather in concentric layers. In LIVINGSTONE'S "Zambesi," it is mentioned that in latitude 12° south and longitude 34° east, the surfaces of rock which during the day were heated up to 137° Fahr.,

cooled so rapidly by radiation at night that, unable to sustain the strain of contraction, they split and threw off angular fragments from a few ounces to one hundred or two hundred pounds in weight.

These potent forces, assisted by the disintegrating influence of the heavy rainfall, have, it is quite possible, been able to remove nearly all traces of the great ice age which might have been observed in the locality.

The rainfall in some seasons is certainly stupendous. Whilst coming up the river in September 1887, I saw from the boat, in some places twenty or twenty-five feet over my head, the slender rootlets of pendent bush-ropes knotted at that height by boatmen whilst passing during the height of the heavy rainy season which prevailed in that year.

The section of the soil on the placers varies but little. In some, notably that of the CHARLES Brothers, on the Mara Mara, the red earth known as *cascajo* in Venezuelan diggings may be seen; but, as a rule, the various formations are as follows:—1. top soil or humus, two to four inches; 2. white quartz sand, one to two feet or more; 3. quartz gravel, one and a half to three feet, part of which may or may not contain gold; 4. the pay dirt composed of heavy iron manganese sand, white clay, and last gold, which rests almost invariably on blue clay, probably a disintegrated greenstone. This blue clay, it appears, has never been penetrated, and although it may in many cases be the true bed rock, there seems to be no reason why another and lower layer of pay dirt should not exist. It might often be found remunerative to sink one or more trial holes in search of an understratum; and also to follow the gold deposits up the hill sides in

the hope of discovering the quartz vein from which the gold has come.

There are certain rules which nearly always hold good with regard to the deposits of placer gold. The metal is never found far from the veins from which it has come. It has been liberated by mechanical forces from the quartz which originally contained it, and both metal and shattered fragments of rock have been washed down the hill slopes by the action of rain or floods, the nuggets and coarse gold being always discovered nearest the veins from which they have come, and the pieces decreasing gradually in size as the distance from the vein increases. In the Puruni, as in placer districts generally, the pay dirt is richer at the bends of the creeks or water courses, where there appears to have at some time existed a dam or impediment to the free flow of the water, and also richer at the junction of two creeks though one of them may not be auriferous. This is no doubt owing to the heavy specific gravity of gold, which sinks at once and remains fixed on any diminution in the velocity of the carrying agent. Round the roots of the trees—Mora, Corkwood etc.—near the creek beds, which spread widely over the ground, the deposits are also richer owing to the same cause.

The implements used in the colony for the extraction of gold have of late been so often described that it is not necessary to touch upon the subject here, except to mention that the best form of tom and torpedo or trapeador, is that used by Mr. LAWRENCE FORBES and obtainable from the store of Messrs. CROSBY & FORBES in Water Street, Georgetown. This machine possesses great advantages over those commonly in use. In the first

place, the greater slope which is given to the tom plate of perforated iron, allows the pay dirt and stones to be thoroughly raked up on to the plate, and gives a free passage to the gold through the perforations, lessening the risk of any of the gold being scooped up and thrown aside with the stones, etc., which have to be removed with a spade. In the second place, the torpedo is made much larger than usual, and entirely covered with a false bottom throughout, pierced with circular holes $1\frac{1}{2}$ inches in diameter, which act as riffles and detain the gold. I once found in one placer on a heap of tailings a small piece of very richly auriferous quartz, which would have easily passed through the plate holes, had the slope of the plate allowed of the efficacious raking up of the pay dirt on to it; and there is no doubt a good deal of gold is thus actually washed, only to be thrown away through carelessness and defective implements.

The gold mining industry appears to maintain its position, though the confidence of the investing public has been thoroughly shaken, owing to the many fruitless expeditions that have been sent out on promises of rich returns for the money laid out. The country, however, has every reason to congratulate itself that its losses have been so small, and that there were no very extraordinary finds of gold made, for had the colony acquired a sudden and wide-spread reputation for auriferous wealth, without being able to continue the output at the same figure, there would, no doubt, have been a large influx of miners and men of all sorts, who, as has happened in every country where large deposits of gold have been quickly found, would have started bogus companies, and swindled the public both here and in

England to perhaps a very large extent. In the majority of instances here, there has not been so much swindling as incapacity on the part of the prospectors and managers. The public have now learnt to be cautious, and after all have not suffered very much.

As an instance of what has happened in other gold producing countries, where a "fever" has set in, and of the amount of money there lost, the words of a recent contributor to one of the large English newspapers may be quoted. Speaking of the Transvaal and the promotion of gold mining companies there, he says:—"Kimberley is the money market of South Africa for every kind of speculation. Kimberley saw the spirit afloat in the gold fields and took advantage of it. Companies were floated in the most reckless manner; the newspapers were given the publication of paying prospectuses, and, with some exceptions, printed glowing notes along with them. Unfortunately, at the time of the "rush," the greatest of all newspapers gave the matter a tremendous push by the publication of an article from which it appeared the fabulous richness of the discoveries was a settled thing. In any company, before allotment of scrip took place, shares now went to a premium.

• "And what tale does the share list tell to-day? Out of ninety-eight De Kaap companies, nearly all of whose scrip was at a premium in 1886-87, the £1 shares of thirty-eight are now quoted at a discount ranging from 6d. to 15s., seventeen are quoted at a slight premium, and the remainder are already lost in oblivion.

"For three years, 1885-87 the total export of gold from the Cape Colony and Natal, was 124,215 oz., value

“ £443,110, but it must be borne in mind that against
“ this is to be set a capital of nearly £12,000,000, that the
“ gold was obtained from rich and often picked quartz
“ or conglomerate, comparatively superficial, and the
“ fact that 25 per cent. profit on capital is expected from
“ gold mining.”

No doubt a large proportion of this £12,000,000 belonged to investors in England, and according to the foregoing extract much of it will never be seen again. In this country, with an output of 11,906 ounces value £44,210 for last year, there has not been invested, I venture to say, a hundredth part of the amount of money invested in South Africa. Who can say what the output would be, were a vast sum like this to be laid out in the development of the industry here, where no great attempt has yet been made?

It was of course not to be expected that success would attend all the numerous ventures floated here, for in gold mining, it is the few who make fortunes, and not the many. Here the loss, small though it may have been, was, in many cases, complete, owing mainly to the incautiousness of the investors who trusted to unscrupulous men, of whom they had little or no previous knowledge, and whose capabilities were in many cases derived from the fact that they had perhaps worked two or three times on a placer, merely as labourers and shovelmen, or as transporters of loads from the riverside, under men who knew scarcely any more than themselves, and had acquired the knowledge of batea working, and the method of fixing up a tom and perhaps washing it up at the end of the day's work.

Considerable loss and inconvenience are experienced

by the claim holders, through the sickness, real and assumed, of the labourers employed by them. Five men are required to work one tom properly, when the ground is ready stripped for washing, and there may be, say, ten men in the party working two toms, all hands being thus employed. If one falls sick or counterfeits illness, a smaller amount of dirt is washed, and a correspondingly smaller amount of gold is obtained.

The invalids do not appear, however, to lose their appetites, since they receive their rations as regularly as ever ; and if they cannot devour them at the time, keep whatever they are unable to swallow till they feel inclined to work again, and then indulge in one huge gluttonous feed. I have heard one man boast that he had demolished, at one sitting, three days' rations which he had saved whilst out of health. I myself saw him afterwards eat eight large perai, and rice in proportion, without apparently any effort.

It is imperative that systematic malingering should be stopped. On some claims the men have to pay for their food if they do not report their illness early in the morning before work commences and take the medicine supplied them ; and though this has a slightly deterrent effect on the men, it can of course be no remedy for the dead loss sustained through the undermanning of the tom ; and it would be well were a more satisfactory method employed to ensure constant attendance at work. ,

A system of co-operation might be adopted wherein the labourers should be guaranteed a certain percentage of every ounce of gold made by their united efforts, in addition to their wages. This would, I think, ensure a

larger amount of work per day, and less likelihood of undesirable men being engaged to go to the diggings ; for the hands would find it to their advantage to be certain of the fitness of their companions for the life and work, and would take care to warn their employers against the engagement of lazy, worthless or unhealthy men. The interest too which they would naturally feel in the work, under such favourable circumstances, would no doubt incite them to work harder and better than they now usually do.

The absence of fresh vegetable food is a great drawback to life in the district. There is no reason why the vegetables commonly grown on the coast lands of the colony should not thrive and bear abundantly in the soil of the Puruni district, for in many places it consists of a stiff yellow clay very similar to that of the coast. There is an absence of leaf mould, which, considering the ~~primeval~~ nature of the forests is very curious ; and when the leaves which have not long fallen are swept away, the yellow soil is met with immediately underneath. In swampy places, however, where the ground is low lying and wet for the greater part of the year, there is a certain but very small amount of leaf mould to be seen, and here also it is not uncommon at night to see some of the leaves that have been turned over and disturbed, glowing with a pale, ghostly, phosphorescent light.

I planted behind my benab a quantity of cassava, plantains, bananas, ochroes and tomatoes, which at first did not promise well, but which gradually improved, and, when I left, were thriving. Since my return to Georgetown, I have heard that very fair returns have been given

by this small attempt at agriculture; and I feel sure my health would have been better, had I had access to such a supply of good fresh vegetable food.

It would, I think, pay well to plant small patches of cleared forest land, for the placer holders and their labourers would be only too glad to get the produce as a change from the eternal rice and flour, and as a means of increasing their powers of resisting fever and malaria.

Of the future of the gold industry here but little can be safely asserted, since the country has been but very imperfectly prospected—in reality a mere scratching, so to speak, in a small piece of ground when the extent of British Guiana is considered. The knowledge of the existence of gold in paying quantities in this colony, made itself manifest at a time when the attention of the investing public in England was attracted to Australia, New Zealand and the Transvaal. Of these three, the first two had already acquired a name and fame for their golden treasures, while the Transvaal, by judicious puffing, easily attracted the money of gold speculators and became a good ground for company mongers.

The climates also of all these three countries possess great advantages over that of Demerara, and besides this they have never enjoyed the dubious privilege of being maligned wholesale. The white man, it is true, cannot, as a rule, hope to work with impunity in water, under the conditions unavoidable when washing for gold, but such work may well be left to the black labourers who scarcely seem to suffer, whilst he may with advantage, devote himself otherwise to superintending and directing operations generally.

The country here is a peculiarly difficult one to

prospect, more so for quartz perhaps than for shallow placers, covered as it is by dense forests, and though approachable by water, yet guarded by dangerous falls and rapids ; while the hardy prospectors have, in addition to these obstacles, to combat the inclemencies of the weather, and to submit to almost ceaseless discomforts and hardships : sometimes for many hours wet through, without fire or the prospect of making one, and occasionally being short of food, or even quite destitute.

One of the chief deterrents attending every mining venture here, is the expense. It is essentially not a poor man's country in the same sense as California or Australia. It would do much to promote the industry, if the rural black population could be induced to club together in parties of say five or six men and buy a tom, a few tools and some provisions, and take to the gold bush and prospect and work wherever they liked,—not interfering of course with parties already located and working. Hundreds of such parties might be formed, and with such a number scattered over the country; there is every likelihood that really rich spots would be found, both quartz and placer claims. It may be objected that these people would spoil the country by their unskilful methods of treating the gold-bearing soil ; but good news does not take long to travel, and a good find once made, its existence would soon be generally known, and the owners—black people—would be only too glad to speedily sell the same. The money they made would also change hands rapidly, and effect a real good to the colony.

From the opinions of diggers who have worked in Cayenne and Surinam as well as this country, it may be

gathered that British Guiana is quite as rich in auriferous soil and rock as either its French or Dutch namesakes, and judging by the output of these countries to the East of us and the Caratal mines to the West, it seems very unlikely that the gold deposits which occur so largely in all three localities should, at the period of their genesis, have so to speak skipped the territory comprising British Guiana. It is only reasonable to suppose that this belt of gold bearing strata extends uninterruptedly with varying richness through our own territory.


In the event of the Puruni road from Cartabo in the Mazaruni to the Mara Mara Creek in the Puruni, ever becoming an accomplished fact, it will form a splendid base for prospecting; and running, as it will do, through the heart of the country between the Cuyuni and Puruni Rivers, it will place the most paying and richest spots within the more or less easy reach of prospectors. But to encourage the industry, roads must be made which can be rendered serviceable for mules or cattle, and even for carts, and inducements given to the people to settle in the gold bush, to plant fields and provision grounds, and to form small village communities, whence the labourers required for digging could be recruited, and where they would gradually acquire the habits of life necessary to enable them to cope successfully with the hardships to be met with in mining, and thus in reality become the nucleus of a mining population, so urgently needed.

The capital of the numerous and small companies started was, with only one or two exceptions, too small to stand any reverses; and even these exceptions were but small ventures compared with similar undertakings

in Cayenne and Surinam. To carry on gold mining successfully, more money must be embarked than has hitherto been available ; and in reality the whole situation of the future may be thus briefly summarized :—" we want *money and miners.*"

The Records of British Guiana.

By N. Darnell Davis.

“UR RECORDS! Where are they?” This was the sceptical enquiry made by one whose interests are bound up in the welfare of British Guiana, when a fellow-colonist spoke to him about some of the Records of the Magnificent Province. The object of this paper is to show, so far as the limits of space in *Timehri* will allow, not only where those Records are, but, also, what they contain.

Records of the settlements of Demerara, Essequibo, and Berbice, before the XVIIIth century, must be sought for in the archives of the Netherlands; chiefly at The Hague, in Holland, and at Middelburg in Zeeland. Of the XVIIIth century itself, and of the present century, abundant Records exist in the Public Offices of British Guiana. Those of “the most ancient colony of Berbice,” are preserved from “decay’s effacing fingers,” at the Colony House in New Amsterdam. The Records of Demerara and Essequibo are to be found for the most part in the Government Secretary’s office, at the Public Buildings, and in the Registrar’s Office at the Victoria Law Courts, both offices being in the City of Georgetown.* Some “old rubbish” is also stored in one of the two

* Mr. Dalton, Registrar of the Supreme Court, has been good enough to ascertain that, in Georgetown, there are Wills, from 1767; Transports, from 1770, Contracts of Ondertrouw, from 1760; Miscellaneous Deeds, from 1764.

small out-buildings adjacent to the Government Offices, Georgetown, whilst the top story of the building now occupied as an office by the Chief Commissary, has long been used as a place to shoot such "rubbish."

What the old Records contain, will best be learned by giving notes of their contents, as these may be gathered from Indices in English, made not many years ago by two colonists knowing in the Dutch language. These experts were employed in the work of indexing the old Dutch papers, only so long as a vote of the Combined Court for the purpose lasted. When that was spent the work was discontinued. The Volumes thus indexed* are preserved in the Government Secretary's Office, Georgetown. The Notes following do not pretend to give more than a mere idea of what can be learned about some of the subjects upon which information is desirable. Documents relating to the question of cutting a Canal between the Essequibo and Demerara Rivers abound, and would, of themselves, make a book, if printed. There is also a copy of the famous Plan of Redress. These, and numberless other matters are, however, not even mentioned in the following Notes.

THE SUPREME AUTHORITY IN HOLLAND.—On January the 7th 1792, the King of Holland assumed the direct control over Demerara and Essequibo, on the expiration of the Charter of the West India Company, and proclamation was made that all officers were to be continued in their appointments until further orders. Up to that date, the Directors of the Company, the States General of the Netherlands, and the Stadtholders, had from time to time exercised authority over the colonists. The last named issued *Instructions* for Governors and

Councillors, on the 13th of April 1773. On the 23rd March 1772, the Sovereign issued an Ordinance with respect to persons using improper language and behaving disrespectfully towards the Courts. This was republished in the colony on the 24th of March 1788. On the 4th of October 1784, the Council of Ten ordered the Director General to send to Holland every year a certain quantity of preserves made of fruits growing in the colony.

THE COLONIAL GOVERNMENT.—The colonies were governed by a Directeur General, at Head-Quarters, with a subordinate officer called Commandeur, in direct charge of the sister colony. There was a Colonial Receiver of Taxes, a Secretary and Bookkeeper, and a Fiscal.* The homely title of Bookkeeper, appears to have originated from the keeping of the books of the West India Company's Estates in the two colonies. On the 2nd of October 1773, the ~~Council~~ Policy of Essequibo prescribed the mode of keeping the colony's books (p. 325). In 1779, the Court of Directors of the Company, ordered that a yearly account of Poll, and Colonial, Taxes, signed by the Colonial Receiver and two members of the Court, was to be sent to the Directors. On the 17th May 1778, the Directors wrote out instructions about the rank of the Fiscal (p. 293).

* Matthias Tinne was appointed Receiver of the colony of Demerara on the 14th of July 1794, by the Council for the colonies. On the 6th of July 1795, he was appointed Secretary of the colony by Governor Beaujon. When the office of Secretary was conferred by Patent upon John Sullivan, that gentleman appointed P. F. Tinne to be his Deputy, on the 28th of April 1804. This latter as the Secretary to the Court of Policy, countersigned the *Articles of Capitulation*, of the 18th September, 1804.

On the 16th of January 1779, 50 guilders were voted to the Marshal, BOIN, for distributing *Publications* in Essequibo (p. 137.) The Administration of the colonies was reformed by Deputies of the States General, 26th May 1789, (Lo. F. No.)

THE COLONIAL LEGISLATURE.—On the 5th of October, 1766, the Court of Policy of Essequibo passed a Resolution as to absent Members (p. 25). On the 14th of April, 1772, the Members of that Court protested against serving unless they were paid for doing so (p. 206).^{*} On the 2nd of January, 1773, ALBERTUS BACKER requested permission to resign his seat. This was granted, and thanks were voted to Mr. BACKER for his services (p. 261)† On the 5th of February, 1778, there is a record of the arrest of the Members of both Rivers (p. 85). This action seems hardly in consonance with a Publication of the 6th August, 1776, with regard to respect for ~~authorities~~ (pp. 204, 213, 229). On the 2nd of March, 1779, A. THIERENS applied to be excused from serving as a Member, and was so excused (pp. 158, 159). The Court of Policy resolved, on the 31st of July, 1797, that any person who should be elected a Councillor of Policy, was to be obliged to accept the office, under a penalty of 3,000 guilders.

Then, as now, Colonists stood upon the order of their

^{*} In 1773, Demerara was given a Court of Policy of its own.

† Albertus Backer was appointed Commandeur, *ad interim*, of Essequibo, on the 18th of April 1787. On the 18th of August 1789, he was appointed Governor, in the room of Jan l'Espinasse, and was re-appointed Commandeur of Essequibo on the 31st March 1793. Leave of absence was granted to him, for one year, on the 31st March 1794, and, on the 2nd of August 1796, he was re-appointed Commandeur of Essequibo on his return to the colony.

going, and even in those times the Home authorities were called upon to settle questions of precedence. A resolution of the Council of Ten, of the 10th October, 1774, prescribed the Rank of Members at the Meetings (p. 170), and another Resolution of the 13th April, 1773, provided for precedence in the Combined Court of Policy for the two colonies (pp. 147 to 164). On the 14th of May, 1778, the Council of Ten expressed their astonishment that their instructions with regard to holding the Combined Court of Policy twice a year, had not been observed (p. 281.)

THE COLLEGE OF KEIZERS.—On the 13th of April, 1744, J. C. VAN BERCHEYCK was allowed to resign his rank as Captain and Elector of the Burghers, on condition of his becoming Major of the Militia (p. 5). As hereinafter noted, JAN DUDONJON applied, in 1746, for a Certificate of Honesty, and was refused ~~it~~ ^{He} was a Member of the College of Keizers. His colleagues of that College thereupon protested against sitting with him, 'as he is a dishonest man' (p. 20). There was much ado in consequence, but, as the outcome of the character given him, or taken away from him, DUDONJON was, on the 28th October, 1746, dismissed from the Militia and from the College of Keizers (p. 22). The Council of Ten defined the Powers of the College on the 15th of May, 1776 (pp. 195, et seqs.). On the 12th of January, 1779, the College sent up two names to the Court of Policy for the election of one Member of the latter body. After one of the names had been chosen, the Election was annulled, and the College was asked to make a fresh nomination (p. 62). On the 15th of April, 1790, an election became necessary to fill the vacancy

caused by the departure of CHARLES DESBARATZ (p. 13.) On the 8th of June 1796, the Court of Policy reprimanded the College of Keizers, and enjoined upon them not to refuse to serve as members of the Court of Policy when thereto elected.

GRANTS OF LAND.—A Resolution as to the granting of lands was adopted by the Court of Policy on the 29th September 1770 (p. 123). Information was asked for by the Court of Directors, on the 24th of November 1772, as to the rights and conditions of granting lands in Essequibo and Demerara. A Resolution of the Council of Ten at Amsterdam, dated 14th April 1773, conveyed authority to make grants of land, under conditions. Instructions from the Court of Zeeland, dated 27th December 1773, regulated the same matter. The proceedings of the Court of Policy on the 2nd October 1773, ~~included~~ the question of the jurisdiction of the Court as to grants of land (p. 323). The conditions of grants of land were dealt with in Resolutions of the States General, between the 14th April 1773 and the 21st September 1774 (pp. 13, 49, 57). The Court of Directors at Amsterdam had something to say upon the subject on the 12th October 1794 (pp. 1 to 3). By a Resolution of the Council of Ten, of the 1st of May 1776, it was ordered that charts should be attached to applications for lands (p. 142). In the minutes of the Courts of Policy and of Civil and Criminal Justice of Essequibo and Demerara, there are notes of Publications of Titles to land, on the 7th May and 3rd June, 1790, and on the 18th May 1792. A Resolution of the States General, of the 9th August, 1792, laid down Rules for the granting of lands (pp. 76 to 84). As to Depths, in 1752, 750 Roods

was fixed. Before that year, a Depth was 500 Roods. A Resolution of the Court of Policy on the 11th August, 1765, dealt with the Depths allowed behind the plantations, for cutting wood (p. 5). The Minutes of the Combined Court of Policy of the 20th of June, 1775, include the question of Measurements of lands in both Rivers; and a Resolution of the Council of Ten, at Amsterdam, of the 17th May, 1766, relates to grants of lands and double depths (pp. 187 to 189). On the 16th of August 1787 the Governor and Court of Policy ordained that all persons who had obtained grants of uncultivated lands, should build upon the same within six months, and have such lands properly measured, under penalty of having them restored to Government. A Proclamation with respect to uncultivated lands in Canal No. 3, was issued on the 17th of May 1799. With so many transactions in land, there was of course need of Land Surveyors, among whom the brothers De Saffon are frequently named. On the 5th of October 1771, the Court of Policy interrogated the Land Surveyors with regard to the difference in the length of their chains, and upon other points. A Resolution was adopted with regard to the iron rod to be used for measuring lands, and as to the mode of using it (p. 184). On the 14th of January 1772, Reports of Measurements were laid over, and it was ordered that Publication be made of them, (p. 201). A Resolution of the Court of Policy, on the 3rd July 1773 (p. 297), provided for the prevention of disputes arising through difference in the Land Measurers' chains. On the 5th of May 1790, the Governor and Court of Policy required all persons who had obtained grants of land to exhibit the same within

six months from date. On the 30th April 1792, Governor BACKER required all grantees to call for their "cards of measurement" within three months, or to forfeit the same to the West India Company on the expiration of that period.*

ACRE MONEY.—In the minutes of the Court of Policy of Essequibo, at a Meeting held at Fort Zeelandia on the 4th May, 1766, will be found a Letter of the 2nd December 1765, from their High Mightinesses with regard to Acre Money, and a Resolution of the Court thereupon. In the minutes of the Combined Court of Policy, held at the same place, on the 19th of June 1775, the introduction of Acre Money into both rivers formed a subject of deliberation. The postponement of the discussion upon the question of the introduction of Acre Money is noted in the minutes of the Court of Policy on the 12th and 18th of January 1778, (pp. 2, 16). In the Court of Policy, on the 16th January 1779, there was a proposal "to publish" the introduction of Acre Money.

WHITES.—By a Resolution of the Council of Ten, dated 30th of September 1784, it was proposed that Dutch peasants should be induced to settle in the Colonies, there to breed cattle, &c. The Immigration of

* The following is an Extract from a Report made to Governor Sir Henry Light, on the 18th of January 1839, by William Hadfield, Crown Surveyor —" The Dutch Government, on the first settlement of the Colony, gave grants of 2000 acres, and some even greater, but it was afterwards deemed advisable to limit them to 1000 acres—subsequently to 500, and lastly to 250, with a provision by which the grantee was entitled to an additional 250 acres, on shewing that he had in cultivation $\frac{1}{3}$ ds the extent of his former grant Since that they have been by the instructions of her Majesty's Government, of date 5th March 1831, limited to 100 acres"

European farmers is contemplated in a Resolution of the 15th October following. The Combined Court of Policy at Fort Zeelandia, ordered on the 10th of January 1774, that there should be one white man over every 30 slaves on an estate, in both Rivers. By a Publication of the 11th February 1784, all plantations were required to have one white man for every 50 slaves. On the 19th October 1778, a Proclamation was issued in relation to white servants and slaves. There is mention of a list of inhabitants in Essequibo, in the Minutes of the Court of Policy of the 6th March 1779 (p. 168).

SLAVES.—The catching of escaped slaves is mentioned in the Minutes of the Court of Justice of Essequibo, on the 3rd of July 1747, and owners of slaves were forbidden to make them work on Sundays, at a meeting of the same Court on the 8th of January 1748. The Minutes of that body on the 6th of January 1766, contain a request that the sinews of a runaway slave might be cut, which application is noted as postponed to next Court. The Combined Court of Policy, on the 24th of June, 1775, decided that slaves were liable to pay taxes, as being "private persons." In the Minutes of the Court of Policy of Essequibo, held at Fort Zeelandia on the 18th of March 1779, there is recorded an account rendered for plantains delivered for the use of Galley Slaves. So early as the 9th of October 1769 do the Resolutions of their High Mightinesses and the Court of Directors, tell of correspondence with the Court of Madrid, with regard to the desertion of slaves to the Orinoco, which, after many years resulted in the Extradition Treaty made at Aranjuez, between Spain and the Netherlands on the 23rd of June 1791. It is somewhere stated

in these Records that the runaway slaves did not gain by their escape, as, after promptly baptising them, the Spaniards made them work harder than their Dutch masters had done. A decree of the States-General of the 23rd of May 1776, provided that, in the case of slaves going to Europe and returning to the colony, security should be given for any such slave leaving the colony,

The Court of Policy enacted on the 24th May, 1784, that all slaves were to pay the colony 100 guilders for their manumission. On the same day in 1785, it was further ordered that property left by slaves at their death should belong to their masters, and that no person should sell any slave, unless such person proved the slave to be his property. On the 6th of August, 1794, Governor GROVENSTIN, prohibited slaves to carry and fire any guns, under heavy punishment, and from the 13th June, 1795, slaves were not allowed to walk abroad, either by day or night, without a special permission from their masters. On the 4th of April, 1796, Governor BEAUJON allowed the importation of slaves in Neutral vessels, and on the following 27th of July, it was forbidden to import slaves without a special licence, under penalty of 1,000 guilders. On the 24th of July, 1784, it was ordered that three acres of plantains should be grown, on each Estate, for every slave.

INDIANS.—Among the Resolutions of their High Mightinesses and the Court of Directors is one dated 19th November, 1717, allowing the inhabitants to purchase Indian slaves in the Orinoco. Another Resolution of the 16th November, 1752, treats of the Trade in Indian Slaves. On the 3rd of July, 1753, the Trade in Red Slaves formed a subject for the considera-

tion of the Court of Policy of Essequibo. It was not until the 1st of May, 1793, that, by a Proclamation of GROVENSTIN'S, it was forbidden to purchase or take Free Indians as slaves. The Council of Ten at Amsterdam, on the 10th of October, 1774, enjoined upon the Colonial authorities that the friendship of the Indians was to be cultivated. The treatment of the Indians was considered by the Combined Court of Policy on the 24th of February, 1776. The kidnapping of Indians was before the Court of Justice of Essequibo on the 6th and 19th of January, 1750, and that body enjoined non-interference with the Indians, at its sitting on the 7th October, 1755. The same Court decided upon the appointment of an Indian Interpreter on the 21st March, 1768. Grants of land to the Indians are dealt with in a Resolution of the Court of Directors of the 30th of September, 1784.

RELIGION.—In the Minutes of the Court of Justice of Essequibo, on the 5th July, 1745, there is record of an application to the Court for the 1½ per cent. charged on Vendues, to be given in aid of the repairs to the Church. The Court granted favourable letters to the Consistory, to their High Mightinesses (p. 12). A Resolution of the Council of Ten at Amsterdam, of the 15th of April, 1773, treated of the building of a Church (p. 241). In the Minutes of the Court of Policy of Essequibo, of the 2nd October 1773, there is an application from the Sexton and Precentor for payment by a fixed salary for burial of the dead. The good man also asked that money due to him for binding books in the Secretary's Office, be paid to him, (p. 325). In the Minutes of the same Court, of the 4th of February 1779,

there is mention of panes of glass for a Church, (p. 157). The Court of Policy of Essequibo, on the 5th of March, 1779, resolved that land was to be granted at Fort Island, for a Church (pp. 164, 165). On the 8th of January, 1780, the Court of Policy received a remonstrance from the Reverend Mr. LINGUIS against the smallness of the amount allowed for ringing the Church Bell (p. 391). The Council of Ten, on the 30th September, 1784, ordered that a Church was to be erected in Demerara for the extension of Religion (p. 47). So far back as on the 8th April, 1748, a day for General Thanksgiving was fixed by the Court of Justice of Essequibo (p. 34). On the 3rd of February, 1778, the Court of Policy ordained that a general Thanksgiving should be held on the first Wednesday in May, in each year (p. 48). It speaks well for the Colonists that, so long ago as the 5th of January, 1771, the Court of Policy should have adopted a Resolution imposing penalties upon parties detected in the illtreatment of dumb animals (p. 138).

COURTS OF JUSTICE.—On the 12th of August 1765, it was decided by the Court of Justice of Essequibo, to have prayers before the opening of the business of the Court (p. 1). On the 27th of November 1769, an application from the Baron VAN GROVENSTIN, to practise, before that Court, was rejected (p. 249). The Baron survived this repulse, and afterwards became Governor of the united colony.* A Resolution of the Council of

* To carry out the Plan of Redress, which had been sanctioned by the States General, the Prince of Orange appointed Baron Van Grovenstin and Mynheer Boey, Commissioners, to proceed to the colony and there inaugurate the new state of things. They arrived in the colony in May 1789. On the 31st of March 1793, publication was made that the Prince of Orange had appointed the Baron to be Governor General and

Ten at Amsterdam, of the 15th April 1773, treats of the hearing of cases, of the nomination, election, and resignation of members of the Court, and of their salaries, (pp. 237 to 239). A Resolution of the Council of Ten, of the 7th October 1784, laid down what Laws, &c., were to be in force in Demerara and Essequibo, and dealt with Preferent Claims, and many other important matters (pp. 26 to 28). There are Resolutions of the States General of the 7th and 10th October 1774, relating to the Administration of Justice (pp. 165, 169). The States General, on the 10th October 1774, ordered that certain Law Books were to be kept in use in the Courts of Justice, for reference (pp. 195, 196). By a Resolution of the Council of Ten at Amsterdam, of the 10th October 1774, Law Books were to be sent to Demerara. On the same date it was decided to give an increase of Table Money for the Demerara and Essequibo Courts, and the quantity of Rum to be allowed to the Director General and other Officials, was regulated. (pp. 91 to 107). Of the Punishments inflicted by the Courts, the following are instances. On the 1st of April 1754, a mulatto slave named LON, for desertion, was sentenced to have his ears cut off. On the same day, CESS, a free creole, for impertinence to C. F. CONNING, was ordered to be severely flogged (p 86, 87). Some-

Major General of Demerara and Essequibo In May 1795, Van Grovenstein, apparently siding with the Revolutionary Party in Holland, threw up the Government, and sailed for Martinique in the frigate Zebra Upon this, the Members of the Court of Policy formed themselves into a Provisional Government, on the 9th of May 1795. This state of things lasted until Governor Beaujon assumed the Government, by appointment, dated 29th June, from the States General.

where between 1765 and 1769, one ROSEN was sentenced to be exposed under the gallows for an hour on 'a public day,' with a cord round his neck, and to be banished from the colony, whilst his property was to be confiscated to defray the expenses of the suit. On the 3rd of July 1769, PIETER, JAN, LOUIS, and QUAKHOE, negro slaves, charged with riot, were sentenced to be whipped, their ears and noses to be cut off, after which they were to be banished from the colony (p. 219.) Upon the question of punishing by banishment, the opinion of Dutch lawyers, was enclosed with a Resolution of the States General of the 2nd of October 1772 (p. 223). In the Court of Justice of Essequibo, on the 3rd October 1769, a proposal respecting the purchase of another negro to be employed as Executioner, was referred to the Court of Policy (p. 249). Compensation was given to owners by the colony for slaves executed for crimes, until the 1st September 1795, when indemnification in such cases was abolished.

In Civil Matters, the working of the Courts may be illustrated by the following notes. On application to the Court of Justice of Essequibo, a certificate of good character was, on the 3rd January 1746, issued to D. DOELEN. At the same time, the Court refused a similar certificate to JAN DUDONJOV. On the 7th of July 1768, the Court granted a certificate of good character to the Baron VAN GROVENSTIN (p. 162). Letters of Protection were granted to one MOORE, in the year 1767, for ten years, for the re-establishment of his affairs, (pp. 80, 95). In the Combined Court of Policy, held at Fort Zeelandia, on the 10th January 1774, it was resolved to have the names of persons desirous of leaving either

river, published and re-published, (p. 4). In the Resolutions of the States General, on the 28th August 1775, there is an opinion of Dutch lawyers respecting an Appeal, Pro Deo, against a sentence of the Court of Demerara (p. 147). The publication of claims against Boedels was provided for by the Combined Court on the 29th of June 1775 (pp. 92 to 96). The Court of Justice of Essequibo, on the 5th of May 1766, allowed 5 per cent. for the administration of Boedels (p. 41). As to Intestates, there is an opinion of the Orphan Chamber, on the 10th April 1752, as to persons dying without wills, (189). On the 9th July 1791, it was ordered that notice be given in cases of deaths of intestates, (p. 200). The charges and commissions of the Orphan Chamber were dealt with by the Council of Ten at Amsterdam, on the 10th October 1774, (p. 170). Publication as to Insolvents' Boedels in Demerara and Essequibo was provided for by a Resolution of the States General of the 30th of May 1777 (pp. 336 to 361). It was ordered by the Council of Ten, on the 4th June 1778, that no member of the Court should be a sequestrator (p. 318).

MARRIAGE.—The Advocate TROTZ seems to have had some trouble in getting married to Mrs. SPOORS. One MILBOURNE stopped the marriage, as appears by the proceedings of the Court of Justice of Essequibo, on the 10th of December 1765 (p. 25). TROTZ thereupon brought a suit against MILBOURNE, and gained it. MILBOURNE appealed, and the publication of Banns was postponed in consequence [See Minutes of Court of Justice, 10th December 1765, and 7th July 1766, pp. 19 to 27, and 49]. In the same Court on the 5th of May 1766, an application was made for leave to marry the wife of a

man who had left the colony some years before (p. 41). On the 3rd of October 1768, Invariable Disunion was held to be good cause for a separation between man and wife (p. 180). In 1776, a case arose where it was desirable to publish the Banns of Marriage three times in one day. The Colonial Court granted the application on the 20th May, and the parties were married (pp. 188 to 200). The matter was reported to the Council of Ten at Amsterdam, who approved of what had been done, and they sent out a Resolution as to publishing three Banns in one day in special cases. On the 3rd and 5th of June 1790, the Governor and Court of Policy resolved that no persons should be allowed to marry out of Church unless they paid the colony 100 guilders. (L. G. No. 7).

TRANSPORTS.—On the 5th of January 1771, S. C. VAN BERCHEVCH made an application to the Court of Policy of Essequibo that an error made in passing a certain Transport should be rectified. The application was granted. On the 4th of July 1772, a Resolution of the Court of Policy was passed with regard to Fees for Transports. On the 10th of October 1774, the Council of Ten at Amsterdam made rules for the Passing of Transports, and, in May 1776, the same body fixed provisionally the charges for Transports and Mortgages. In the Combined Court, on the 23rd February 1776, there was a discussion as to the Passing of Transports (p. 171). In the Court of Policy on the 19th of October 1778, there was a discussion upon Transports and Mortgages (pp. 101, 106). It was not until the British Occupation, that it became requisite to advertise Transports and Mortgages intended to be passed. This was done by an order of the Court of Justice, dated 7th May,

and published on the 16th May, 1807, which required three advertisements in the *Gazette*.

MORTGAGES.—In the Court of Justice of Essequibo and Demerara on the 6th January, 1766, a decision was given that Mortgages are Preferent Claims (p. 35). On the 4th of April, 1769, there was an order of the Court of Justice respecting the Passing of Mortgages (p. 48.) The same Court ruled on the 28th of November following that non-production of Certificates of the Vendue Master invalidated Mortgages, (p. 254.) On the 8th of July 1774, the States General forwarded an opinion of Dutch Lawyers upon a question relating to Mortgages, (p. 28), and on the 18th of August 1777, the same body dealt with the question of Mortgage as a Preferent Claim (pp. 368 to 380.)

SEPARATION OF DEMERARA FROM THE GOVERNMENT OF ESSEQUIBO.—From its constitution as a Colony in 1745, Demerara was ruled by the Courts of Policy and Justice of Essequibo. In 1773, the settlement of Demerara had become so considerable that the latter was given a Court of Policy and a Court of Justice of its own. On the 25th of January 1773, the States General granted the Courts power to exercise certain rights over the Colonies of Essequibo and Demerara. Respecting the Laws and Regulations in force before the Separation, there were Resolutions of the States General, dated 6th October, 1774, (pp. 54, 56), and 30th May 1777, (p. 350.) The Combined Court of Policy held at Fort Zeelandia on the 10th of January 1774 (p. 2), and the 23rd June 1775 (p. 55), laid down that the Jurisdiction of Essequibo commenced at the Boerasirie Creek. In 1806, Governor BENTINCK proclaimed, on the 22nd November, that

from the 1st January 1807, the Boundary of Demerara should extend beyond the Boerasirie Creek to the Bonasique Creek. The confusion in the Secretary's Office of Essequibo, at the time of the Separation, is mentioned in the Minutes of the Combined Court, of the 30th June 1775 (pp. 125 to 136).

TRANSFER OF THE SEAT OF GOVERNMENT FROM ESSEQUIBO TO DEMERARA.—By a Resolution of the Council of Ten, of the 30th of September 1784, it was ordered that the Headquarters of both Colonies were to be in Demerara, and that the Director General was to reside there (p. 106). A Resolution of the same body, on the 14th of the same month, had ordered that "the City of Demerara" should be called STABROEK, and that the Director General and Members of the Court of Essequibo and Demerara were to be informed of the same (p. 101). It seems reasonable to conclude that the name of STABROEK was given by the Council, out of compliment to one of their own number, as, on the 14th August 1780, the Court of Policy had received notification from the Council of the death of one of this body, and of the appointment in his stead of MYNHEER GEELVINCK, Lord of STABROEK (p. 7). The publication of the name thus given appears to have not been made until the 11th of February, 1785,* (L. B., No. 7). On the 2nd of February 1785, the Directors of the West India Company appointed JAN L'ESPINASSE to be Governor of

* On the 29th of January 1799, Werk-en-Rust was incorporated with Stabroek. The union of Stabroek and the adjoining districts under the name of Georgetown, was resolved by Governor Carmichael and the Court of Policy on the 29th of April 1812. See the Notice in the Essequibo and Demerary *Royal Gazette* of the 5th of May 1812.

Essequibo and Demerara (L. B. No. 1), and on the 8th of June following, the Governor and Court of Policy enacted the Union of the Courts of Policy of Demerara and Essequibo, publication of the fact being made on the same day. The Union of the Courts of Justice of the two Colonies did not, however, take place until the 1st of April 1812, during the British Occupation.

But for the Indices, in English, the contents of the volumes of old Dutch Records would be, to most colonists, mysteries as hidden as are the meanings of the Picture Writings on the rocks of Guiana, from which *Timehri* takes its name. With the help of the Indices, however, enquirers gifted with a knowledge of Dutch may yet do something to let us learn more of the Colony's past than has hitherto been within our ken.

A Collecting Trip on the Abary Creek.

By the Editor.



FROM time to time during the last two years, the Abary Creek has been suggested to me as *the* creek where one should collect—a creek where one might get the largest of our mammals and birds in profusion, and where alligators of huge size were to be procured almost by the picking up. As the largest of our animals were all desiderata in the Colonial Museum, a fortnight's collecting trip up the creek was undertaken; and the 5th October last found me on my way thereto. The result of the short trip certainly proved the creek to be a very good hunting district, even though the most favourable time, August, according to the huntsmen, had not been chosen. As regards large alligators, however, the less said the better. The reptiles were undoubtedly plentiful, but of small size—the largest observed being about seven feet in length, but of large girth, and extremely shy and difficult to procure. Possibly the time of the year and the very dry weather had something to do with it. Let that be a sufficient excuse for the non-appearance of the giants!

The creek itself is of a fairly interesting nature, not inconsiderably varied as to its surroundings. Close to its mouth it is quite narrow, with a width of about four rods, and lined with a dense growth of tall mangrove trees; but higher up it widens considerably, to about from 12 to 30 rods, with a most tortuous course, and with a general trend almost approaching a parallel to the coast and to

the lower part of the Berbice river, with which a large branch of the upper part of the creek communicates. The banks are lined with a low bushy growth, consisting largely of mucco-mucco, corkwood and water-wallaba, skirting the savannah which spreads on both sides of the creek for a considerable distance, and which is visible from the boat through the numerous wide gaps in the low bush. Frequently, however, the bush is absent for miles, and the grass of the savannah reaches to the edge of the water, thus yielding extensive views of the flat country, and allowing full play to the breeze which, to some extent, compensates for the loss of shelter from trees.

Along nearly the entire course of the creek, the traveller is continuously exposed to the full power of the sun, since close along the banks where, in the morning and evening, a certain amount of shelter might at times be obtained, the logs and stumps in the water entirely preclude any advantage being derived therefrom. This, at any rate, is the case in the depth of the dry weather; doubtless in the rainy season when the creek is full of water, the circumstances are different. To one ordinarily accustomed to a sedentary town life, this continuous exposure to the sun became after a while most painful, and though a small tent or covering would have removed the distressing cause, this luxury was foregone, since the huntsmen declared that on the open creek it would be the means of frightening game; and as the procuring of game was the chief object of the trip, the risk was not run, even though this reputed effect of a tent was doubted.

Early on Saturday, October 6th, a start was made from the Abary bridge with two bateaux—a large one for luggage

and for taxidermic operations, and the smaller for hunting purposes. The dogs constantly throughout the day started waterhaas (*Hydrochærus capybara*) among the mucco-mucco, but few chances occurred of procuring them owing to the thick bush along the banks, which gave shelter when they rose to breathe. Three rather small specimens, "pigs" as they are termed by the huntsmen, were, however, caught, being seized by the dogs before they reached the water. The flesh of the young "pigs" is extremely delicate, and tasted to me not unlike veal. Quite in accordance with the old name "waterhaas," the terms "boar," "sow" and "pig," are applied to the various animals; but it need hardly be noticed here that the waterhaas has no affinity whatever to the hog. It is a true *Rodent*, like the guinea-pig, the rat, the rabbit, the labba, and the squirrel, with two tusk-like incisor teeth above and below adapted for cutting, and with no canine teeth, but with a wide interval between the incisors and the molars. The external characters, such as the sparse bristly hair, the hoofed toes, and the general shape of the body, remind one of the hog, though the tail is absent, the ears are short and the head destitute of a snout.

Apart from the relish of the sport and the desire to furnish skins for the "bass," there was a keenness of interest displayed by the men in hunting "meat," which only received its full explanation in the evening when a camp had been made among the trees, and a babracot was in full swing, with its complement of separate pieces of waterhaas, belonging to the different members of the crew and destined for future home use! Apart from the "meat" question, however, it was a most pleasing

feature of the trip to note the interest taken by the men in procuring specimens, and in aiding to skin them when possible, and in keeping them well exposed to the sun in order to dry them thoroughly. Doubtless the explanation of this was to be found in the fact that different members of the SEARS family and their friends made up the crew ; and imbued as these men are with a keen appreciation of hunting, and with a reputation that is by no means local, their interest found expression not only in procuring specimens, but also in their later preparation. Certainly no crew could have been more useful, though, without any doubt, an Indian crew would have been more quiet on more than one occasion.

The first night's camping in the open air without any shelter beyond the sparse foliage of the trees which allowed clear visions of the sky, was by no means unpleasant. The weather was as fine as could have been desired, as was the case throughout the whole trip ; though at times, as on this night, heavy masses of black clouds, piled upon each other, seemed threatening to break the record. Vivid and frequent flashes of lightning in the western sky cast a fitful halo on the deepening gloom, rendered more sombre by the contrast with a horizon of fire raging in the distance on the wide savannah. Full-voiced music, at times a plaintive negro melody, at others a solemn chant or hymn, rang forth with pleasing cadence from the men as they lay rolled in their bags or matting on the ground, happy after a heavy meal of water-haas ; until, unmindful of the blood-sucking bats which were said to be very plentiful along the creek, they one by one succumbed to sleep, undisturbed by mosquitoes, of which fortunately they were none—an exemption that was

enjoyed and fully appreciated throughout the whole trip.

The one drawback in the day's hunting, had been the bursting, while being fired from the boat, of one of the barrels of a double-barrelled muzzle-loader belonging to one of the men ; but luckily no injury resulted to anyone, unexpected and unallowed for as was this departure from our programme. The other barrel, however, throughout the trip did good service ; though it was thenceforth regarded as "suspect," and was carefully granted a certain amount of "latitude."

Early the next morning, the chase for waterhaas began. The first operation, repeated every morning on starting, was the propitiation of the river-god by the captain, the senior SEARS, who, I suppose with that object, always sprinkled a little rum in the water on each side of the boat for good luck, at the same time anointing his eyes "to make him see clear"—an operation that generally brought forth the remark from another SEARS that "he knew a better place for it than that." The boats were slowly paddled close to the bush, while the dogs and one man drove the game. Several beasts were started, but ineffectually, until at last one large boar was shot after an exciting chase, during which it dived and turned marvellously, rising to the surface for brief intervals, until it was wounded, when it had to seek the surface more frequently and for longer periods owing to hæmorrhage, and thus gave a better chance of a telling shot. The animal was extremely fat, and the paring down of the skin gave occupation far into the evening.

All through the day, "quaaks" (the various species of *Cancroma* and *Botaurus*), shypooks or choughs,

white and blue gauldings, and white cranes (*Ardea*, sp.), the common and the beautiful longtailed old-witches (*Crotophaga* sp.), kingfishers (*Ceryle* sp.), kiskadies or "Qu'est-ce-qu'il-dits" (various species of *Pitangus*, *Megarhynchus*, *Myiozetetes* and *Tyrannus*), red-headed carrion crows (*Catharista aura*), pigeons (*Columba rufina*), hawks (species of *Milvago*, *Rosthramus*, *Hypotriorchis*, *Urubitinga*, *Buteogallus* and *Harpagus*, etc.) and a few other species of shrikes and icterids, were plentiful; but, with the exception of the commoner and smaller kinds, they were extremely shy and difficult to procure.

At intervals, the pigeons and quaaks rose from the thick clumps of the water-wallaba or tall mucco-mucco in great flocks, the latter, especially, rising to great heights and circling backwards and forwards out of range, with their incessant cry of "quaak." Dense flights of "blackbreasts" or golden plovers, (*Charadrius virginicus*) occasionally came down the creek or settled in patches by the waterside. Muscovy ducks (*Cairina moschata*) and vicissi ducks (*Dendrocygna* and *Chenalopex* sp.) at times whirred from the low bush, but seldom giving the chance of a shot; while along the waterside where the grassy reaches occur, the small sandpiper or wagtail (*Tringoides macularius*) and the lovely spur-wings (*Parra jacana*) ran backwards and forwards as though undecided what was best to do.

It was somewhat of a surprise to me to find the Canje pheasant or hoatzin (*Opisthocomus cristatus*), locally called "hanna," along the creek, and apparently as plentiful here as they are in the Berbice River and the Canje Creek. The explanation of their presence is most

likely to be found in the fact of there being a water communication between the Abary and the Berbice at some distance up, along which the birds have spread almost throughout the whole course of the Abary.

During two short visits to the lower part of the Canje Creek and the Berbice river in March and May of this year, I made an examination of the food contents of several specimens of the birds, and, without exception, nothing was found in them but the leaves of the "pimpler" (*Drepanocarpus lunatus*) which is extremely common in those districts. The Abary specimens, on the other hand, contained nothing but the leaves of the mucco-mucco (*Montrichardia arborescens*); and it was noticeable that the "pimpler" was scarcely represented along the creek, there being only a few clumps of it along the lower part. The birds in the Canje and the Berbice, I have been assured by Dr. YOUNG, frequently contain mucco-mucco fruit and leaves; but I am unaware whether this was eaten for want of, or in preference to, the "pimpler."

These birds along the Abary were in very poor condition as regards plumage, since it was apparently their moulting period. Not a single specimen was shot in which the quills of the wings and tails were fully developed. It appears that the flesh of these birds is not infrequently eaten; and, from Dr. YOUNG'S observations, it seems that if the viscera be removed from the body as soon as the bird is killed, the rank odour is eliminated from the flesh.

Late in the afternoon Tiger Island was reached. Here there is a commodious building, thatched and partly open-sided, but floored—something between a benab and

a house, if one may make a distinction. Tiger Island consists of a small tract of slightly elevated land, on which there are a few large forest trees, on the left bank, a few miles below the pumping engine house of Plantation *Bath*. In the wet season, it is said to be strictly an island, since the surrounding savannah is flooded with water; but in the dry weather it is a splendid camping ground, giving extensive views of the savannah on both sides of the creek—on the left bank bounded by a high ridge of *Æta* palms (*Mauritia flexuosa*) and on the right stretching away as far as the eye can reach, with occasional clumps of trees like forest islands on the plain. The house is beautifully situated on the top of the high land, and fully exposed to the delightful breeze from across the savannah.

Here the Toco bill-bird (*Ramphastos toco*) having an inordinately long and indescribably rich orange-coloured bill, with a large ovoid black patch at the tip, occurs, together with the common red-billed species (*R. erythrorhynchus*). They are, however, very shy and were difficult to obtain. The blue and yellow macaw (*Ara ararauna*) is sometimes found here also, and a dried skin of one which had been shot a short time before, was hung up inside the house. In the rainy season, the large Waders, such as the negro-cop (*Mycteria americana*) and the Heeri (*Ardea cocoi* ?), are said to be plentiful in the surrounding savannah; but in the dry weather they are difficult to find, and even more so to obtain.

This first Sunday evening at Tiger Island was extremely beautiful. The young moon, about two days old, was sinking as a pale crescent on the star spangled

sky; heavy masses of clouds lay on the horizon above the trees; while below, from the burning grass of the savannah, great lurid sheets of flame at times rose up as though in sudden fits of passion. Against such a scene, the next morning was of its kind almost a matchless contrast. The rising sun lit up the glistening, dew-covered savannah, where irregular patches were bathed in a white changing mist; across the creek, the red sky shone, reflected as from a burnished mirror in the water, and the mucco-mucco island in the front lay with its counterpart below, all seen with a bright and glorious sheen streaming through the trees. On the left bank, the savannah lay bathed with dew, for all the world like an inland lake, but being gradually dissipated by the touch of dawn.

A day was spent at Tiger Island in order to hunt the district. For this purpose, the Æta swamp was ranged by the huntsmen and the dogs, while a boating party went a little distance along the creek. The district was said to be too dry for game, and all that the huntsmen brought back was a large "Mahooka" or horned screamer (*Palamedea cornuta*)—a bird about the size of a very large turkey, with a horny string or whip-like appendage at the back of the head, and with two large and formidable spurs on each wing. These birds, to judge by their curiously loud clanging cry in the morning, are common all along this part of the creek; but this specimen was the only one obtained.

The boating party had a somewhat exciting time with a school of broad-tailed otters or "water-dogs" (*Pteronura sandbachii*), which were met with between the pumping engines of Plantations Bath and Blair-

mont. A large nest of helpless young ones was discovered under a large clump of grass by the water-side, and one of them was taken out and made to squeak in order to attract the old beasts. About a dozen of these appeared around the boat, and the steering paddle was several times bitten by them under the water. Two were shot, but the shots were not immediately fatal; and the brutes careered madly about, staining the water with their blood, until at last they took refuge in some thick bush where the chase had to be abandoned. When the nest was visited at the end of the chase, it was found deserted, the otters having been devoted enough to carry off their helpless young, in spite of the man who was waiting close to the nest to get a shot. One of the approaches from the water had been unnoticed in the hurry; and evidently the brutes had taken advantage of the opportunity. My regret at leaving the scene empty-handed was decidedly keen; for the otters were of immense size for their kind. We rowed about for a long time in a desultory sort of way, hoping against hope to find a wounded one by the waterside; but we had to content ourselves with a white boatbill (*Cancroma cochlearia*), a vicissi duck and a few plovers. It was disappointing also to find that all the boatbills were in immature plumage. Not a single specimen was crested with the remarkable, long, black plumes that give so striking an aspect to the bird. In place of these, there was a bluish-black tuft of down, both on the white birds and on the younger reddish-brown specimens. The plovers noticed were also all of them young, and of small size; doubtless the larger and older birds had already gone further south in their migration.

All along this part of the creek, the savannah gives pasturage to herds of cattle. Lower down, they are found on both sides, but higher up, they are confined to the right bank. Still further up, far beyond *Blairmont*, immense ranges of savannah land exist, well suited for cattle raising, but the land lies useless awaiting energy and capital. In many parts the grass is soft and suitable; but in the greater extent, a hard, tall, and coarse razor grass baffles even man's progress. When burnt down, however, it makes room for the softer grasses, and in not a few districts where fire had recently run its course, these softer grasses were in course of growth. The tall razor-grass effectually prevented one from seeing any game that might have been browsing, and indeed quite effectually prevented one from tramping much about these savannahs. The men set fire to the grass on every possible occasion, and as the lower two feet consisted almost entirely of close dry refuse, into which one sank at every step almost above the knee, it burnt with intense rapidity and fury, the fire blazing up like an angry fiend. At night, especially, it was a grand sight to watch the course of such a conflagration; but in the day, it was more or less of a nuisance, since owing to the twisting and bending of the creek, the fine falling cinders, and the dense smoke would often unexpectedly accost us as we paddled along. At such times, the white plumaged birds' skins that were exposed to be dried, suffered considerably.

On Tuesday morning an early start was made for the higher reaches of the creek. Birds similar to those already named were very numerous; waterhaas were occasionally started from the bush by the dogs; and

otters in abundance dived and frolicked ahead of the boat, enticing a hard and always unsuccessful chase. Late in the afternoon, we camped at Whiroon where Messrs. DAVSON'S Ballata grant begins, and where a small benab exists to mark the former camping-ground. The land is here slightly elevated, but not as much so as at Tiger Island. Between the two points, the savannah extends for the greater part of the way down to the very waterside, long stretches of which are destitute even of a single tree or bush. Soon after camping, one of the huntsmen shot a deer in the long grass, and the skin gave us occupation for the rest of the evening.

The most unpleasant part of the trip was the night spent at this place. Soon after midnight, it became intensely cold; and sleep became an impossibility. A large roaring fire was made up, and we all huddled round it, while a schnap was served out to infuse a little fresh spirit. The camping ground was perfectly exposed, and was swept by a fresh, strong breeze, from across the wide savannah, which breeze brought with it the mist rising from the creek. It was strange, however, that the whole party should thus have suffered at this point, while no inconvenience from the same cause was met with while travelling further inwards.

Early next morning two hunting parties crossed the savannah to the forest; but again they were unsuccessful in procuring big game. A pair of muscovy ducks, of which the drake was an exceedingly fine bird was, however, shot; and as the species had never been represented in the Colonial Museum, the specimens were welcome additions to the collection of skins. Later in the morning a start was made, the back

of Pln. *Mara* being passed about mid-day. The *Mara* side of the creek here goes by the name of Pourtoco, while the left bank is called Qua-qua. Here the sides of the creek are well wooded, chiefly with water-wallaba, corkwood and mora, amongst which the bullet-tree, trysil, crab-wood, blood-wood and the silk-cotton may also be seen. The scenery is here decidedly interesting, and clumps of cokerite, æta, and manicole palms are occasionally seen scattered amongst the forest trees.

During a great part of the day, a large flight of negro-cops had kept in view in the distance in front us, and speculation was rife as to whether a shot would be got at them as they gracefully circled, and one by one alighted; but they were extremely shy and alert, and seeing the boat, as it rounded a turning, they leisurely rose and circled upwards and upwards, until they could barely be distinguished. It was a most interesting sight, to watch their easy, graceful circlings, at one time dark against the white fleecy clouds, and then suddenly, as their white wings caught and reflected the rays of the sun earthwards, flashing with light, and with a whiteness that showed clear against the clouds. Circle after circle they described in this manner, upwards and upwards, crossing and recrossing each other in their course.

Soon after, a bend of the creek brought us suddenly in view of an immense array of negro-cops or jabirus, and of "nigger-heads" (*Tantalus loculator*) standing in a swampy part of the creek, about 150 yards ahead. A few of the birds raised their heads as we came in sight, but the rest remained in a dignified pose with their necks thrown back, and their long black bills turned slightly downwards. The boat was at once put

back, and as the winding of the creek allowed of the "nigger-heads" alone being approached with the chance of getting close to them, the attempt was made, and three large specimens fell to the guns. The "nigger-heads," as they are termed, are smaller than the negro-cops; they are of a prevailing white or cream colour, with rich bluish bronze-green quills in their wings and tail; the head and the upper part of the neck are bare of feathers in the adult and are covered with loose thin scales on a black ground; the bill and feet are black, and the former is thick, long and slightly curved towards the blunt tip. A fine maroodie (*Penelope* sp.) was shot soon after; and a camp was made at the first suitable place to allow of the specimens being more conveniently skinned. As the place was surrounded by high grass, a fire was set to it to make a clear space, and soon after all hands were called upon to beat down the flames lest it should take over the camp and all even against the high wind. The grass was dense and high, and the fire burned with fury. Late at night, the sight was really wonderfully grand. Away in the distance, a sheet of flame seemed to spread for miles, every now and then leaping up, into the sky as it were, as it caught some æta palm or high mora tree, and blazed like a huge ball above the horizon of flame below.

The next morning (Thursday), as we started, a dense mist lay over the creek, and hung over till long after the sun had risen. Soon after starting, a place called Coupmans was passed, where there is the remnant of a benab at the site of a track leading into the forest on the Ballata grants. A splendid clump of bamboos grows at this place, the stems being nearly as tall as the surrounding

forest-trees. For the greater part of the way the banks of the creek are lined with trees skirting the savannah ; but at intervals, a dense forest growth occurs, on slightly raised land, continuous with the forest further in, where the mora is in abundance, while water-wallaba and corkwood, with the cokerite and manicole, are less plentiful, and the bullet-tree is occasionally seen.

All along the creek, the track of large animals, such as the tapir, deer, and waterhaas, are plentiful ; but the latter alone could be obtained and a large specimen was shot in the afternoon. Otters were plentiful along our whole course, but only a medium-sized specimen was procured—the old specimens being wary to the last degree. Early in the day, a large opening on the left bank, Ababbo Creek, nearly dry owing to the drought, was passed. Here there was another track made by the ballata bleeders ; but only an old tumble-down benab marked the site. Late in the afternoon, another large creek, on the left bank, Tauraculi creek, was passed, but it was even drier than the Ababbo creek. The Tauraculi creek was said to mark the highest point of the Messrs. DAVSON'S ballata grants which extended down to Whiroon, but we nowhere came in contact with anyone in connection therewith, and even the sign-board marking the site was absent from the Tauraculi station—at least it was not to be seen where the men said it ought to be found.

Just below this point, where there is a small extent of swampy ground, the crested Lap-wing (*Vanellus cayennensis*) locally termed the "Bucktown Spurwing," was seen for the first time, and one specimen was obtained. The bird is of a rare and most handsome

species, the upper part of the body being of a glossy coppery hue dashed with green and purple. The forehead, chin, breast, wings and half the tail are black and the rest of the body a pinkish white. The head is furnished with a long narrow crest, and the wings are furnished with a powerful spine. The legs are long and red or bluish-red and furnished with four toes, of which the hindmost is rudimentary and not applied to the ground.

Along this part of the creek, the avifauna differed considerably from that of the lower reaches. The boatbills, quacks, gauldings, and ducks were not met with; though pigeons were as plentiful as before. Various species of kingfishers, woodpeckers, jacamars, manakins, tyrant-shrikes, parrots and small macaws were plentiful—the latter in immense sets, but shy and difficult to obtain. The small macaws (*Ara macuvuana* or *Æta* parrot, and *Ara hahni*) crossed the creek morning and evening in almost continuous flights, but high up and generally out of range. The blue crane, and the diver or ducklar (*Plotus anhinga*) at times travelled along the creek, but well ahead of the boat; and the bush curri-curri (*Harpiprion cayennensis*) rose at intervals from the bushes. A "Little Ducklar" or "Frog-footed Duck" (*Heliornis fulca*), dark brown above and grey below, with streaks of white on the head and neck, with a sharp and narrow bill, and with a web divided up around the toes, was often seen skimming along the surface of the water, which its wings and feet often just slightly splashed, but more frequently they were but just seen before they disappeared below the water.

Iguanas (*Iguana tuberculata*) were also very plentiful; and several were shot on the lower branches overhanging the water, to the great delight of the men, who seemed to enjoy them more than any other kind of flesh. I must confess that with waterhaas and birds in profusion, I did not fancy the flesh of these lizards, though a small portion that I tried, tasted not unlike chicken.

The camping-ground selected for the night was situated, as we found next morning, immediately below the creek that leads to the Berbice River, or that was said to lead thither. Soon after starting on Friday morning (12th) we came up to it. This branch is comparatively large, but after a mile or two, it narrows rapidly and becomes impassable owing to the dense matting of branches overhead and the large quantity of fallen trees in the water. In the rainy season possibly it may be clear. A few miles above this point, the main creek continues as a wide stream, and then, almost suddenly, it leads off into the several smaller creeks, which, by their union, produce it. This is where the alluvial soil meets the sand. All these smaller creeks, were entered, and ascended as far as the small bateau could travel, the large bateau having stuck hopelessly in the sand at the entrance of the largest of the side channels. The bed and sides of these channels were composed of a fine white sand. Doubtless in the wet season, these small creeks are passable even for large boats.

The forest here shuts out the view completely, and whether the savannah extends beyond or not, it was impossible to judge. As regards animal life, the district

seemed to be almost barren. In the forest, the shrill piercing whistle of the "Pi-pi-yo" or green-heart bird (*Lathria cinerea*) alone could be heard, and this the only bird seen. Along the small channels, through the dense low bush closed in by the forest, the common blue butterflies (*Morpho*) and the common yellow butterflies were the only insects noticeable. We wandered about for some time, to see if anything could be found ; but in the absence of tracks or paths, but little could be done ; and I determined to return to the lower reaches where fortune had been more kind. Skins were made of a few small macaws, and of the swallow-winged barbet (*Chelidoptera tenebrosa*)—the only barbet seen during all the time of the trip ; and when we reached the camping ground which we left in the morning, we turned in for the rest of the day, so as to be better able to skin and prepare a large waterhaas sow that had been captured.

Early next morning we left the Tauraculi district, obtaining on the way two lapwings at the same swamp where we had procured the one two days before, besides a very fine specimen of the yellow-backed mocking-bird (*Cassicus persicus*), a small long-billed kiskadee, a rare hawk, and a maroodie. The only "tiger" of the trip was met with on this afternoon : but it was seen from a distance as it plunged into the water to cross the creek ; and whether it was a jaguar or an ocelot, it is out of the question to say. A rare species of bill-bird (*Selenidera* sp.) was seen close to the high bamboo trees at Coupmans, but unfortunately it was not procured.

All along the course of the creek, we met with the effects of the fires which had been set two or three days

before. The savannas lay bare for considerable distances, right away to the forest, and huge trees were burned nearly to their very summit, shewing the effect of the heat on their foliage. The fire at different points had crossed the creek, the sparks setting fire to the dry grass across a width of more than 15 rods. At the camp in the evening, the scene was most weird. The sun, setting behind a brilliant, almost a rich carmine, sky, seemed as though it were leaving a desolate and ruined world, for all around and as far as the eye could reach, the savannah lay bare but for its bed of ashes and the charred stumps and sticks which had survived ; and by the pale moonlight at night the scene became not only weird but solemn.

On Sunday evening we reached the old camp at Whiroon ; but remembering the former miserable night in the low bēnab, I had my hammock slung in the bush some little distance back from the creek, whither the greater number of the men also made their beds. In the bush here, the goatsuckers (*Caprimulgidæ*), kept up an apparently ceaseless cry. All through the night, whenever I woke, the plaintive cries sounded, "work, work, work to hell" in a deep guttural tone, while " whip, whip, whip, poor Will," came as a sort of shrill refrain, whether from the same kind of bird, but of a different sex, or from a different species, it was impossible to tell. Mingled with these, was the continual querv " who are you ?" uttered, at times, so close and loud, that it seemed like a rude challenge of one's presence ; while again, so low, that it came like a fearful whisper. It was out of the question, under the circumstances, to find out what species of goatsuckers gave

utterance to the three cries; but it would be an interesting point to decide.

On Monday evening, we reached Tiger Island; and here amid the high mucco-mucco, in the muddy part by the waterside, I met with the only snake seen on the trip—a large yellow-tail (*Spilotes corais*)—a perfectly harmless creature, but having all the same a bad reputation. It was in the act of eating an immense toad (*Bufo aqua*); and as I approached, it made for the waterside. There was nothing for it but to shoot it, and I was rather amused to see the toad, which the snake had released in its final throes, hop quietly and slowly away over the soft mud.

Tuesday was spent at Tiger Island, in order to give a full day's sunning to the skins, and to make the final packing up of the luggage for the return to the Abary Police Station. A hunting party was, however, sent out, which brought back four fine specimens of the Caraow (*Aramus scolopaceus*). Next morning early the start was made, and though that journey was our last, it was by no means the least important, since, besides a young waterhaas that was caught by the dogs, seven fine specimens of birds, belonging to four species that were not represented at all in the Museum, were procured.

The trip, on the whole, had been a successful one. More than 80 skins of birds, very many of them of large size, referable to 47 species, and six mammals, of three species, besides a few miscellaneous things, were brought down in good preservation and suitable for mounting. The attempt had been made to procure especially those specimens that were not represented in the Museum collection, or that were represented only by old

specimens, faded by long exposure to the light ; and as the very great proportion of the skins were of this nature, the result was satisfactory. The extreme paucity of insect life during the trip was noteworthy ; but what the explanation of it may be, I am unable with any degree of probability to suggest.

Reptiles, with the exception of alligators, iguanas and salemmenta lizards (*Teius*) were very scarce. Two land-turtles were met with by the water-side, but they were of the common species (*Testudo tabulata*) ; and though rattlesnakes were said to be plentiful in the grass on the savannah, none were encountered. Of fish, no interesting specimens were obtained. A species of "perai" was said to inhabit the creek, and sundry tales were told of their voracity and of the various injuries caused by them ; but no actual cases came under observation, nor were any specimens procured, or even seen. In this department of Natural History, a rich harvest yet awaits patient research in the various waters of the colony.

Occasional Notes.

Prof. Leidy and Parasites.—The following, quoted in the *Annals and Magazine of Natural History*, from the *Proceedings of the Academy of Natural Science*, Philadelphia, 1887, gives some not uninteresting pictures of a famous naturalist. "Prof. LEIDY remarked that the habits of a naturalist often led him to observe things in our daily life which usually escape the notice of others. In our food he had frequent occasion to detect parasites which he preferred to reject, but which are unconsciously swallowed by others. While he liked a herring, he never ate one without first removing the conspicuously coiled worms on the surface of the roes; and he had repeatedly extracted from a piece of black bass or a shad a thread-worm which others would not distinguish from a vessel or a nerve. While he did not object to the little parasitic crab of the oyster, he made it a point to remove the equally frequent leech from the clam. It was in a piece of ham he was eating that he first noticed the trichina, which was no doubt one of the causes that led MOSES to declare the pig to be unclean; and in the hundred tape-worms he had examined from our fellow-citizens during the past twenty-five years he had ascertained that they had all been derived from rare beef. During one of his visits to Charleston, S.C., before the late war, at an evening entertainment, among other viands were nicely browned slices of the drum-fish, *Pogonias chromis*. A friend informed him that some portions were more gelatinous and delicate than others,

and helped him to what was supposed to be one of such. On cutting into it he had observed imbedded in the flesh a soft mass which appeared of enigmatic character. The following day he procured from market a drum-fish, on the dissection of which he found imbedded in the tail several egg-shaped masses, about 3 inches long and less than an inch thick, which proved to be a large coiled worm (*Acanthorhynchus reptans*). This it was that gave delicacy to the dainty, and in this instance the parasite seems to enhance the excellence of the food. At another entertainment nearer home he partook of some stewed terrapins. Taking into his mouth what appeared to be an egg, it produced such an impression as led to its rejection. Seeming so peculiar he tied it in the corner of his handkerchief for more convenient examination. The specimen, now exhibited, was a membranous bag which contained thirty yellowish-white maggots from 8 to 22 millim. long, by 1.5 to 3 millim. broad. They are the larvæ of a bot-fly, and resemble those of the *Gastrophilus* of the horse. Their characters are as follows:—Body of the larva fusiform, acute anteriorly, obtuse posteriorly, consisting of twelve segments, including the head, which is armed with a pair of strong, black, hooked maxillæ; terminal segment with a pair of trilateral, oval, chitinous disks, each with three spiracles; intermediate segments with numerous minute recurved hooklets, disposed in incompletely separated bands at the fore and back part of the segment.

The sac containing the larvæ is about three fourths of an inch long and half an inch broad, with a short tubular prolongation open at the extremity. It was uncertain whether the sac formed part of the intestine.

The dish of stewed terrapins was suspected to have been a mixture of the diamond-back, *Emys palustris*, and the red-bellied terrapin, *E. rugosa*. This is not the only instance of the occurrence of bots in turtles, as Prof. A. S. PACKARD notes the case of larvæ being found in the skin of the neck of the box-turtle, *Cistudo carolina*."

Haiari Poison.—Through the kindness of Mr. RODWAY, I have been able to make the following interesting extract from an old number of the *Proceedings of the Botanical Society*, Edinburgh (for 1837, when the late Mr. W. H. CAMPBELL was the Secretary of the Society). Dr. MACLAGAN at the June meeting, 1837, exhibited specimens of the root of the Haiari, received by him from Mr. WATT, Surgeon, Demerara, and gave the following account of the properties of the dried root.

"It was found that the plant, though dried, still retained the property of poisoning fishes. Four ounces of the root yielded 320 grains of watery extract; twenty grains of this extract were diffused through six ounces of water, and two drachms of this in six ounces of water, killed a minnow placed in it. From trials on several minnows, it was found that symptoms of poisoning manifested themselves in about four minutes, and proved fatal, with convulsions, in a period varying from one hour, to two hours and a half. On comparing the effects of this extract on fishes, with extracts of the more ordinary narcotics used in medicines, Dr. MACLAGAN found that in activity it came near to Turkey opium, and was superior to Belladonna, *Hyoscyamus* and *Conium*.

A chemical examination of the root showed that, besides a large quantity of gum and colouring matter, it contained a resin of a light yellow colour and peculiar smell, and an acid differing in quality from any known acid, but regarding the state of combination of which in the plant, no precise information had been obtained; a quarter of a grain of this acid, obviously not in a state of purity, poisoned a minnow in half an hour. The properties of the resin had not been examined."

A new spiny Rat from Demerara—In the *Annals and Magazine of Natural History*, October, 1888, a description is given of a new species of spiny rat (*Loncheres guianæ*), by Mr. OLDFIELD THOMAS, Zoological Department, British Museum. The two specimens on which the species is founded, were forwarded to England to be mounted for the Colonial Museum, and were presented by Mr. JOHN JUNOR, of Plantation Providence, E. B., to whom the Museum has been very greatly indebted during the last year, for large and valuable specimens of animals.

Loncheres guianæ, sp. n.

Fur thickly spinous, the hairs between the spines scarcely perceptible. Muzzle, rich rufous; crown of the head, fore back, flanks, and outer sides of limbs coarsely grizzled black and pale yellow, both hairs and spines slaty-grey for four-fifths their length, the former with a sub-terminal band of pale yellow, the latter black-tipped. Spines on posterior back with a narrow orange tip, which gradually broadens and deepens in colour until the rump is a bright rufous. Whiskers

long and numerous, black. Chin, chest, belly, and inner sides of limbs pale buff, the line of demarcation from the colour of the sides fairly well defined. Tail murine in character, thinly haired and scaly throughout, the scales large, averaging about eight or nine to the centimetre; the thinly scattered hairs brown above, yellowish beneath.

Measurements of an adult skin:—Head and body (c.) 190 millim.; tail 167; hind foot 36.2; ear (contracted) 5.5.

Skull, basal length (c) 47, greatest breath 26; nasals, length, 15.5 interorbital breadth 13; diastema 11.8; length of upper molar series 11.2.

This species is readily distinguishable by its peculiar coloration from all the known species of *Loncheres* with one exception. This is "*Isothrix*" *pagurus*, Wagn. from Borba, Brazil, which has much the same coloration, but differs from *L. guianæ* by having wholly soft fur. That this absence of spines in *L. pagurus* is not due to youth is shown not only by the fact that the type specimen is slightly larger than that of *L. guianæ* but also by the marked spininess of the second specimen of *L. guianæ* which is only about two-thirds grown. Nor is the difference a seasonal one, since the type of *L. pagurus* was captured in July and the smaller Demeraran specimen in June.

Gold Mining in California.—Two passages in the paper, "Gold Mining Notes" in the last issue of *Timehri*,* seem to have been unsatisfactory as to the comparison made between Californian and Australian Stamping Mills; and I therefore gladly publish a letter

* *Timehri*, Vol. ii, Pt 1, New Series, pp. 45 and 46.

on the subject which I have received from Mr. H. S. DURDEN, Custodian and Acting Secretary of the State Mining Bureau of California. The passages referred to are the following:—

“The Reports do not contain a description of a Stamping Mill, but except that the process is or was conducted in California by means of hides or blankets over which the resulting mud or pulp flows, the machine does not materially differ from those in use in Australia. One of the best constructed was exhibited at work by Queensland in the Colonial and Indian Exhibition 1886.”

“It may be safely assumed that the method adopted in Queensland in 1886, is an improvement on the Californian Milling, described in the Reports under notice.”

Mr. DURDEN writes:—“In looking over the article on Gold Mining, I observe that it conveys the impression that we are behind the times in California in the matter of Quartz-milling etc.; while the fact is the reverse. When a mine and mill can be profitably worked, the rock only yielding one dollar and a quarter per ton, as has been, and is being done here, it is the best possible proof of the nearest possible approach to perfection. If the Australians are ahead of us, it is a little singular that they should come here, to investigate our methods, purchase our machinery, and engage the services of our practical miners and millmen. The description given of an Australian mill would answer very well for a California quartz mill also, and if the statement of capacity had been 40 to 70 tons per diem instead of per week it would have been nearer the mark. In fact we have many mills that crush from 80 to 160 tons per day, and the Douglass Island mill which is a California concern

though not in the State, crushes over 700 tons per diem, having 240 stamps, and rock of medium hardness. No mill of any pretensions to efficiency is without rock-breakers, and the breaking of the quartz by hand would be considered quite old-fashioned, as would the use of hides, etc., instead of copper amalgamated plates, and Frue vanners, or their equivalent. Our mechanics probably build, as they claim to do, the best quartz mills in the world, having had over thirty years experience over a wide range of ores, and varieties of quartz, etc. With these exceptions I consider the article in question, very well selected and arranged."

A mimetic Caterpillar.— One of the most curious of these peculiarly mimetic forms of life, has recently been presented to the Museum by Mr. A. C. L. CAMPBELL, who obtained it at the Canal Polder. The body of the caterpillar which is nearly $1\frac{1}{2}$ inches in length, is completely hidden beneath a lateral and dorso-lateral series of lobe-like tufts, seven of which are placed along each side of the body, the four longer and larger lobes being arranged above the others and alternating with them so as to form a zig-zag line. The lobes are cylindrical, and from $\frac{1}{2}$ to $\frac{3}{4}$ inch in length, and consist of a dense mass of short close hairs arranged along a fine thread of the body substance of the caterpillar, among which are thickly interspersed long and fine hairs, the whole having somewhat of the form of a small stem of fine moss interleaved with fine bristles. The prevailing colour of the short hairs is a fine tile-red, but along one side of each lobe and also forming a ring around each tuft at a short distance from the tip, the hairs are black,

and, especially at the dorsal aspect of the sub-terminal ring, they are yellow tipped as though coloured with a fine yellow powder. The long hairs are of a pale yellowish-brown tint. The usual position of these tufts is the horizontal; but at frequent intervals, the dorsal series are elevated by the little animal to a vertical position.

The specimen was found on the soil, so that nothing is known of the food that it selects; and as this was the only one met with, nothing is known as to its life-history. At certain times, it bears some resemblance to a tarantula, while again it is not unlike a coloured plant-like tuft; and doubtless these resemblances serve to screen it from the observation of its enemies.

From the foregoing description, the little animal will easily be recognised if met with, and possibly some one wandering about the country may be able to trace out the other stages of this curious insect. Another caterpillar which is most likely related to it, is commonly to be found on the rose-tree; but this latter differs in being of a brownish yellow colour, with deep brownish-black areas along the back, destitute of the long hairs, and in having flattened instead of cylindrical lobes along the sides of the body. In this latter species, when the cocoon is about to be formed, the flattened lobes become bent under the body proper to form the external covering; and doubtless the cylindrical lobes of the former species serve the same purpose.

Identifications of Guiana Timber Trees.—I am indebted to Mr. RODWAY for the following list of the identifications of some of our timbers. The list which

has been extracted from the Descriptive Catalogue of the Colonial Museum, Haarlem, 1888, forms a most important contribution to our knowledge of the timber trees of the colony :—

Yari-Yari, *Duguetia guianensis* (D C.)

Acouyari, *Cedrela odorata* (L)

Kaboeballi (Cabacalli ?) *Goupia tomentosa* and *G. glabra* (Aubl)

Dâkamaballi or Black Greenheart, *Vouacapoua americana* (Aubl)

Wamara, Bannia, or Brown Ebony, *Swartzia tomentosa* (D.C.)

Hoobooballi, *Mimosa guianensis* (Aubl.)

Kakaralli, *Lecythis ollaria* (L)

Wadaduri, *Lecythis grandiflora* (Aubl.)

Murri Marri, *Couratari guianensis* (Aubl)

Tawranero, *Bumelia nigra* (Sw)

Yuwalidami, *Miquartia guianensis* (Aubl.)

Couramari, Kakali, *Bignonia inæqualis* (D.C.)

Marisiballi (Marciballi), *Bignonia leucoxylon* (L.)

Washiba or Bow Wood (Man-letterhout) *Piratinera guianensis* (Aubl.)

Bouracoura or Letter Wood (Oeman-letterhout) *P. Aubletii* (Poep)

Dally, Waroesi, *Myristica fatua* (Sw.)

Determa, *Nectandra wana*.

Siruaballi, Yellow Silverballi, *Nectandra pisi* (Miq.) and *N. cuspidata* (N. v. E.)

Snake-poison.—A most important and interesting paper has recently been communicated to the Imperial Academy of Sciences, St. Petersburg, by Dr. FEOKTISTOW, on the effect of snake-poison on the animal organism; and a short abstract of this paper, from which the following is chiefly taken, has been published in the *Lancet* for August. The experiments numbered about 300, and were conducted with the poison of *Vipera ammodytes*, *Vipera berus*, and *Crotalus durissimus*, obtained from about 80 of these animals which were kept in a building suitable for them. No physiological

difference could be discovered between the effects of the poison of the three snakes mentioned. The average quantity of poison introduced by a bite was found to be in the case of *V. ammodytes* '065 gramme, the maximum and minimum being '17 and '01 gramme, all the bites being after at least three days' abstinence from biting. When the bites were repeated one after another, it was found that from three to five bites were sufficient to use up all the poison. In the case of *V. berus* only about '03 gramme was delivered per bite, while the rattlesnake (*C. durissimus*) delivered ten times as much or '3 gramme.

Regarding the lethal dose for different animals, it was found impossible to give it with any approach to scientific accuracy, for the fresh poison does not always contain the same amount of water; and the inspissated substance contains albumen and other indifferent substances, the percentage of the active principle being entirely unknown. It does not seem that snake-poison is to be compared with the most toxic alkaloids, as the latter prove much more rapidly fatal even in far smaller doses; though as the percentage of the poison principle in snake-poison is entirely unknown, not very much emphasis can be placed on this statement. It is to be remarked that the young of *Mammalia* during the first four days of life are less affected by snake-poison than adults, even amongst animals which are peculiarly susceptible to it: thus while a full-grown rabbit will die in from one to five minutes after a bite from a large rattlesnake, a rabbit a few days old will live for from ten to fifteen minutes after a similar bite, and a young kitten will survive for some three hours.

The reason of this difference is probably the undeveloped state of the central nervous system.

The best therapeutic means for combating snake-bite are undoubtedly restoratives, especially preparations of ammonia, as they raise the blood pressure, but they are only of service in slight cases. In severe cases, these remedies increase the hæmorrhage of the lungs and other organs. The American plan of giving large doses of alcohol is erroneous in principle, because, while it is true that in small doses alcohol stimulates the vaso-motor nerves, in large doses it paralyses them. LACERDA'S treatment by permanganate injections into the venous circulation, has proved useless in all cases where a really lethal dose of the poison has been given, and appears to rest on an erroneous assumption. Special experiments regarding hypodermic injections of permanganate in the locality of the bite are still required, but its usefulness is very doubtful, for whenever a lethal dose is inserted, it is so rapidly absorbed, that the permanganate injection is almost sure to be too late to do any good. At present a physiological antidote cannot even be conceived to exist, as we have no means of opposing the paralysis of the spinal cord, the intra-cardiac terminal branches of the vagus, the cardiac ganglia, the splanchnics, the respiratory centre, etc. The treatment must, therefore, be conducted on other lines, and Dr. FEOKTISTOW is about to commence a series of researches in a new direction altogether, the nature of which he does not indicate. It must be remarked that death frequently follows snake-bites after a prolonged period, and is due not to any direct toxic action, but to the morbid changes, which have been set up in vital organs.

This chronic poisoning, as it may be called, frequently follows doses of smaller amount than those which are immediately lethal.

As regards snake-bite therefore, it may be summed up, that while the various remedial applications such as ammonia, alcohol, permanganate of potash, etc., are of service in cases where but a small quantity of the poison has been injected, they are but of little use, if not indeed productive of positive harm, where a lethal dose of the poison has been received. The only certain treatment, then, for snake-bite rests with the application of the knife—a complete excision of the affected part being made immediately after the bite or as soon after as possible, while the tight bandage, or india-rubber ring, should be applied above the affected part to prevent the passage of the poison into the general circulation. In such cases, the parts operated upon should be thoroughly cleansed with a strong solution of caustic potash. Before the adoption of such drastic treatment, however, it should be ascertained for a certainty that the bite has been given by an undoubtedly poisonous and dangerous snake.

An interesting point brought to light by the series of experiments here referred to, is the fact of there being no physiological difference discoverable in the action of the poison of the true vipers and the crotaline or pit-vipers. Considering the marked physiological difference in the action of the Viperine and the Colubrine poison, this point is a noteworthy one.

Polymorphic Orchids.—The following interesting note on a Guiana orchid has been kindly prepared for me by Mr. RODWAY:—

“ The fact that certain species of the genus *Catasetum* produce flowers of several different forms, has been known since the time of SCHOMBURGK, who found flowers on one plant which had been hitherto classed under three distinct genera. The following from the *Gardener's Chronicle* of October 27th, describes the latest vagary in this curious genus of Orchids.

‘ Another species of *Catasetum* is revealing the little secret which some of the species, at least, seem so well able to keep. For a considerable time it has been noticed that a plant in the Kew collection was throwing up two quite different kinds of inflorescence, one on either side of the same pseudo-bulb, and this plant has in consequence been watched with an unusual amount of interest. At length the flowers expanded, so totally diverse both in shape and colour, that nothing short of their being borne by the same plant would lead one to suppose they had anything to do with each other. Such, however, is the case—they are simply male and female flowers of the same species, and the plant forms an object of interest unsurpassed in the whole collection.’ It was received at Kew from Mr. F. SANDER, of St. Albans, having been obtained by him from British Guiana.’

The female flowers being similar to those of *C. fuliginosum* (Lindl.) the plant is described under that name.”

Cocoanut as a Vermifuge.—In addition to the multitudinous uses to which various parts of the cocoa-nut tree

are applied, modern experiments seem to promise still wider application. It is but quite recently that satisfactory experiments were performed to shew that as a lining for ships of war, the compressed fibre of the husk of the cocoanut was to the highest degree suitable ; while another opening seems to lie in the path of medicine for the milk and pulp of the fruit itself. It appears from the observations of Prof. PARISI of Athens, that the juice and pulp of the cocoa-nut, when taken in their natural state, has a most intense action on cestoid parasites, and that when these were extruded from the body, the complete parasite, head and all, were discharged and quite dead. As the discovery of these vermifuge qualities was made by him owing to the action of the cocoanut milk and pulp on himself, and as the quality was tested by a number of observations which were most satisfactory, it seems reasonable to conclude that a most simple and powerful vermifuge has been added to the pharmacopœia.

A cosmopolitan Guiana Bird.—Statements are often more or less positively made as to the identity of species of Guiana birds with English species ; it may therefore be worth while to notice here, what has already been noted by others, that the only species of bird which is native both to England and to Guiana, is the common screech-owl, the *Strix flammea*, one of the most widely distributed of all birds, and one found throughout nearly the whole world. Certain other birds, such as the Lap-wing (*Vanellus cayennensis*), the snipe (*Gallinago frenata*), the wren (*Troglodytes furvus*), and the plover (*Charadrius virginicus*), may easily be confounded with

their English namesakes, but in each case the specific identity of the bird is distinct, the one from the other. Perhaps the most positive statements are made concerning the existence of the English thrush in the colony, of which it appears representatives were introduced some years ago. As far as I am able to judge, the point of identification insisted on is the similarity of the song of the birds, but no specimen has yet been procured for examination, nor am I aware that any one has declared that he has *seen* the English thrush as a normal inhabitant of the colony. Of the *native* thrushes of Guiana, there are several distinct kinds, and while there are five or six species—that seem to be generally distributed, there are about six others that have hitherto been only described from the neighbourhood of Roraima. While many of our birds are common also to the temperate parts of N. America, the fact remains that the Barn-owl is the only one that is also to be found in England.

Recent Local Literature.—

Rev. F. P. L. JOSA. "The Apostle of the Indians of Guiana": A Memoir of the Life and Labours of the Rev. W. H. BRETT, B.D., for Forty Years a Missionary in British Guiana. Illustrated. London, 8vo.

N. DARNELL DAVIS. The Cavaliers and Roundheads of Barbados, 1650-1652; with some account of the Early History of Barbados. Demerara, 8vo.

W. A. PATON. Down the Islands: A Voyage to the Caribbees. Illustrated. London and New York, 8vo.

Mrs. GRANVILLE LAYARD. Through the West Indies. London, 12mo.

A. J. POUND. A Supplement to the Magisterial Law of British Guiana. London, 8vo.

J. RODWAY and THOS. WATT. Annals of Guiana, Vol. I., Chronological History of the Discovery and Settlement of Guiana, 1493-1668. Demerara, 8vo.

P. M. NETSCHER. Geschiedenis van de Kolonien Essequibo, Demerary, en Berbice, van de Vestiging der Nederlanders Aldaar tot op onzen tijd. (History of the Colonies of Essequibo, &c., from the settling of the Dutch there, up to the present time). Maps. The Hague, 8vo.

IN MEMORIAM

Rev. John Foreman, died Thursday, July 26th,
1888, aged 65.

(See Minutes of the August Meeting of the Society.)

Robert Wight Imlach, died Thursday, November
1st, 1888, aged 72.

(See Minutes of the November Meeting of the Society.)

Report of the Meetings of the Society.

Meeting held on 12th July.—Mr. G. H. Hawtayne, C.M.G., Vice-President, in the chair.

There were 16 members present.

Elections.—*Members* : Joseph E. Collier, W. D. Young, W. D. Ithell, Rev. Thos Slater and Wm. Nicholl.

Associates : Manoel De Cairos, N. A. Forster, J. A. Massiah, J. J. Gordon, H. A. Cameron, J. B. C. Belmonte and D. Robertson.

The Secretary read a communication from the Committee of Correspondence stating that it had been decided to hold the first Country Exhibition during the month of March 1889, at some place on the East Coast, and that the prizes were to be given to Agricultural labourers and mechanics and artisans, for the best kept cottages, &c., and also for fruit, vegetables, &c.

The Vice-President in answer to a question of the Rev. J. Foreman, stated that it was expected that the whole of the Government grant of \$1,000 would be spent on this Exhibition, and that it was probable that an annual vote of the same amount would be forthcoming.

After a slight discussion in which Messrs. Davis, Cameron and Quelch took part, the details were left to be settled by the Committee of Correspondence and to be reported on later.

The Vice-President as representing the Lecture Committee reported that he had applied to several gentlemen, who, he thought, might be willing to assist the Society in giving the Series of Lectures, and had succeeded in pre-

paring a programme which would embrace the next six months with the exception of October, when he had expected to get Mr. Sargent to say something on "Time and Timekeepers." That gentleman being, however, unable to do so on account of ill-health, a friend of his would probably come forward with such a Lecture, to whom Mr. Sargent would give every assistance. Meanwhile, October had been left blank and the list stood as follows :--

July	...	J. Rodway...	...	Collecting, Old and New.
August	...	Dr. Ferguson	...	Health in the Tropics
September		E. E. H. Francis...		Metamorphoses of Matter.
October	...	...	...	...
November		S. Vyle	...	Electricity at Work.
December...		L. M. Hill...	...	Utilisation of Waste Substances.

The Secretary read a letter from Mr. J. Freyssinier of Santiago de Cuba, calling attention to an overcharge of \$3 20 on a message of ten words by the West India and Panama Telegraph Company. This overcharge affecting Demerara as well as Cuba, the writer asked that the Chamber of Commerce, to which the letter had been addressed, should take up the matter,

The Vice-President asked Mr. Vyle for information on the matter, to which that gentleman replied that he had written an article bearing on the same matter for the forthcoming number of *Timehri*, and he would like that article to be read in connection with it.

The letter was referred to the Exchange Room Directors.

The Rev. J. Foreman then asked the question of which due notice had been given at the previous Meeting :—

What steps had been taken to prevent the use of the Reading Rooms or Exchange Room by those gentlemen whose names had been struck

out of the lists of members and associates for non-payment of their subscriptions ?

In asking the question his wish was to strengthen the hands of the Directors. It had been notorious that, in past years, gentlemen in arrears had continued to use the Reading Rooms for indefinite periods, and he had heard that persons other than members had attended the Lectures. He then referred to the Exchange Room, from which according to the Bye-laws a revenue should be derived, and taking into consideration that the income and expenditure of the Society were now about balanced, if this could be made a source of revenue, it would be of some importance.

The Treasurer in reply stated that he did not believe any of the members in arrears made use of the Reading Rooms, and he was sure that if the Librarian saw any such doing so he would remind them of it. As regards the Library, he did not think that any one who respected the Society or himself would use it when in arrears. With respect to the Exchange Room, there was no revenue derived from it, and he did not believe that any sugar had been sold there for the last 5 or 6 years. The room was hardly used, and any little business which was done, ~~was~~ transacted in the gallery, which was a public place. As to certain meetings held there by the Planters' Association, &c., he was unable to say anything, as it was under the control of the Exchange Room Directors who were at liberty to give permission for using the room.

After some discussion, in which the Vice-President, Messrs. Davis, Quelch, and Drysdale took part, the matter dropped.

Mr. N. D. Davis, in accordance with notice given at the

meeting in January, moved for the annual appointment of a "Commercial Committee." He did not know what were the views of the mercantile body in this matter; they did not appear to feel the need of a Chamber of Commerce, and apparently took no interest in the present motion. His object in bringing forward the motion was to carry out one of the main objects of the Society. The only body that at present looked after the commercial side of the Society was the Committee of Correspondence. From the time of the foundation of the Society up till lately, the great interest of the colony was sugar, both agricultural and commercial. Now several other industries were growing up, such as gold, cocoa and rice. They wanted information about these things, the extent to which they could be carried on, the value of them, and the methods of preparing them for market, which matters would be within the province of the proposed Committee. He did not wish to force his views upon the members; if they were in favour of it, he supposed the Directors would formulate a new Bye-Law and bring that before the next general meeting.

The Rev. J. Foreman seconded the motion and expressed his surprise that such a motion had not been made before. The only difficulty was in the number of Committees being increased. He would suggest that the present Committee of Correspondence should have the power of appointing a Sub-Committee to deal especially with commercial matters.

Mr. Drysdale suggested that the Exchange Room Directors should be merged into the proposed Committee.

The Vice-President thought it desirable that there

should be a Chamber of Commerce in the colony. He thought that the members of the Committee of Correspondence were not so intimately connected with commerce, as distinct from agriculture, as to form such a body as was desirable. He agreed with the motion and thought it deserved the support of the Society.

The motion having been carried unanimously, Mr. Davis undertook to put the matter in a workable form so that it might be brought forward at the Annual Election.

The thanks of the Society were tendered to Dr. Rowland for a copy of the "Hospital Reports", also to Mr. Brown for his offer, through the Colonial Government, of a set of his Forestry Works, which, however, were not accepted, as copies had already been presented to the Society by the Government last February.

Mr. Quelch exhibited a specimen of argentiferous sandstone from Utah; a scraper or chisel made of a fossil shell from Barbados; labaria and bushmaster snakes; and the skeleton of a Canje pheasant; giving some interesting information concerning the specimens.

The meeting then terminated.

Meeting held on 9th August.—Mr. G. H. Hawtayne, C.M.G., Vice-President, in the chair.

There were 10 members present.

Elections.—*Members*: Messrs. T. P. Gilbert, P. Dargan, Major W. T. Walthall, and Rev. James Muir.

Associates: Messrs. C. D. Bascom, W. E. Pasea, C. C. Baker, W. J. Smyth, R. Incledon, and W. Shiells.

The Chairman said that before proceeding to the

usual order of business, he thought it proper to refer to the very great loss which the Society as well as the community at large, had sustained by the death of the Reverend John Foreman. As a member of the Society that gentleman had taken a great interest in its welfare, and endeavoured very earnestly to make its influence extend to the benefit of the humbler classes of the community. He (the chairman) thought that the meeting would agree with him that the Society had lost a member that they could ill afford to spare, and in making these remarks, he was only doing what was due to their late friend, as well as to themselves as members of the Society.

The Secretary read a communication from Mr. A. Weber as representing the Exchange Room Directors, in answer to the request for information in regard to the letter of Mr. Freyssinier, referred to that body at the previous Meeting, in which the West India and Panama Telegraph Company was stated to have been in the habit of overcharging telegrams from this colony to England to the extent of about 31 cents per word.

The communication having been read, Mr. Vyle, the Government Electrician, was asked by the chairman if he had any remarks to make on the subject.

Mr. Vyle stated that he had been in communication with the General Superintendent of the cable in the West Indies, and had been assured by him that the charges were such as were allowed under the existing agreement. The statement of Mr. Freyssinier could hardly be accepted as being free from a little animus against the Company. While on this subject he would call the attention of the meeting to the larger

question of cable communication with Great Britain generally. The roundabout way in which the communication was kept up, and the great expense of messages, had induced him to write the paper for *Timehri*, in which he advocated a direct cable from the Cape de Verdes to Demerara, with a view of getting themselves within easy reach of the mother country. If this direct cable could be laid down, telegraphic communication with England would, he believed, be cheaper than by the present circuitous route, and he would like to see the Panama Company take the matter in hand.

The chairman asked Mr. Vyle whether there was a line at present between England and the Cape de Verdes.

Mr. Vyle replied that there was already a duplicate line, and that there did not appear to be any difficulties in the way of laying a cable along the bottom of the Atlantic, and there was less risk of injury and stoppage of communication than at present.

The chairman said that there was no doubt that the matter was of great importance, and he thought it should be referred to the Committee of Correspondence.

Mr. Davis referred to the question as being a matter of public importance and thought the Imperial Government would have its say on the matter. In case of war it might be of importance to have free communication with the mother country without having messages passed through several countries belonging to other nations. If a route was wanted that would be entirely British, Demerara might be connected with Bermuda, which was in the course of being connected with Halifax, Nova Scotia. He thought the subject would have to be considered, not only connected with Demerara, but as

establishing communication between Great Britain and the whole of her West India Colonies.

Mr. Drysdale proposed and Mr. Davis seconded that the matter be referred to the Committee of Correspondence, which was carried unanimously.

The Secretary read a communication from Mr. Quelch as Secretary of the Committee of Correspondence, reporting that it had been decided by a sub-Committee consisting of Messrs. Jones, Braud, Conyers and Cameron, to hold the first of the Country Exhibitions at Buxton, and that detailed prize-lists were in preparation.

The Secretary read a letter from Mr. J. C. Covil, President of the newly-established Agricultural Society of St. Vincent, asking for a copy of the Rules and Regulations of this Society as a guide in drawing up their own rules. The request being agreed to, he was directed to forward a copy of the Bye-laws, Rules and Catalogue.

The proprietor of the "Louisiana Sugar Report" having applied to the Secretary for copies of Mr. Skekel's paper on his "Cane Mill", and Mr. Abe's paper on "Boiler Corrosion", he was authorised to forward the number of *Timehri* containing those two papers.

The thanks of the Society were presented to the Government for a copy of the Blue Book for 1887.

The Chairman intimated that he had received a letter from Mr. Jenman in reference to the specimens of Forest trees which the Government had directed him to procure, enquiring whether the Society would be willing to pay a portion of the expense of collecting. He wished to have an expression of opinion on the matter, as the Society wished for the specimens.

After a discussion, during which the communication of the Government Secretary was referred to, in which there was no intimation that the Society would be expected to pay for the specimens, Mr. Drysdale said that the matter should be left in the hands of the Government, and as this was the opinion of the meeting, the Secretary was directed to inform Mr. Jenman that the Society could not undertake to pay for the collections. *

Mr. N. D. Davis gave notice to move at the next General Meeting in October, the following additions to Schedule A. Chap. XI. :—

There shall be a Committee to consist of not less than ten (of whom the Exchange Room Directors shall be three), and not more than twenty-four members of the Society, and to be called "The Commercial Committee."

Such Committee shall, in the first instance, be elected at a General Meeting of the Society, but shall have power to fill up vacancies in its own body, and to add to its number, subject to revision at a general meeting of the Society. The Committee shall thereafter be elected annually at the general meeting of the Society in December.

The Committee so elected shall, at its first meeting, appoint a Chairman, a Vice-Chairman, and a Secretary. At all meetings three members shall constitute a quorum.

The Commercial Committee shall endeavour to promote, as far as possible, the improvement of the trade of the Colony, and shall collect and disseminate information tending to develop and increase the resources of the Colony.

Mr. Fleming exhibited a stone axe which had lately been dug from the clay at the back of Pln. *Diamond*.

The Chairman thanked him for the exhibit and hoped he would present it to the Museum. Mr. Fleming promised to ask its owner to comply with this request, and in the meanwhile left it with the Assistant Secretary.

Mr. Quelch asked permission to refer to a matter personal to himself, as editor of *Timehri*. It had been

brought to his notice that certain papers in the last number of that journal had been objected to as being unsuitable from the nature of the subjects treated of in them, and it was implied by the objectors that they represented the feeling of the members generally. Personally he was well satisfied with these articles, and the subjects were of importance to the colony socially. The basis on which the journal had been started was a very wide one ; and a perusal of past numbers shewed that they included papers on subjects in almost every department of knowledge, in which information, bearing chiefly on the colony and colonial matters, could be given. The journal, however, was not his private property ; and if the members generally were dissatisfied with his method of conducting it, the only thing left for him to do was to place his resignation in their hands.

The chairman said that he did not think he (Mr. Quelch) should have taken any notice of these criticisms, unless they came in some tangible form and from responsible persons. He himself had been asked whether he did not think one article in *Timehri* ought to have been rejected as political, but until the matter was brought forward seriously he did not consider that any notice should be taken of it.

Mr. Davis wished the matter to be referred to the Committee of Correspondence, and the Rev. T. J. Moulder supported him ; but the chairman thought that as there was nothing before the meeting in the way of censure of the Editor, it was scarcely dignified to take any notice of the matter. If any member of the Society chose to make a formal complaint or move a resolution then they would be in a position to take steps.

Mr. Vyle suggested a vote of confidence in Mr. Quelch as editor of *Timehri*, but the chairman remarked that by doing so they would be giving the matter undue importance.

Mr. Drysdale said that he was of opinion that Mr. Quelch should take no notice of remarks made by gentlemen outside the Society, or even of those belonging to the Society, unless it should be done at the meetings, and he thought it beneath their dignity to take any account of the criticisms of the kind mentioned. It would be time enough for Mr. Quelch to move when the members of the Society made a motion or resolution in the matter. • •

The chairman said that he thought the opinion of the meeting was, that no notice should be taken of such remarks unless formally brought before a meeting.

The meeting then terminated.

Meeting held on 20th September.—Mr. G. H. Hawtayne, C.M.G., Vice-President, in the chair.

There were 10 members present.

Elections.—*Members*: Lieutenant Lingham, Robt. Crawford, J. Hill Rae and Dr. J. H. Hill.

Associates: Ed. Stack, A. C. Walthall and Thos. McKinlay.

The Secretary read a communication from Mr. D. C. Cameron, Secretary of the Agricultural Committee, reporting that a catalogue of the grasses of the colony had been forwarded to the Mississippi Agricultural College, and that arrangements had been made to procure seeds and specimens, to be forwarded in due course.

The Secretary read a report from the Committee of

Correspondence on the matter of the alleged overcharge on telegrams as stated by Mr. Freyssinier, that, "it was concluded that we had no power to disturb or interfere with the existing contracts."

A letter on the same matter from C. W. Earle, chairman of the W. I. & P. Telegraph Company was taken as read, in which it was stated that "the suggestion of overcharge made by Mr. Freyssinier, a former servant of this Company, is absolutely false." It was ordered that Mr. Freyssinier be informed accordingly.

Mr. Jacob Conrad gave notice of a motion to the effect that :—

Whereas, under the Ordinance, political questions are excluded from discussion at the Meetings of the Society, and doubts have arisen as to the meaning of the word "political," which, if applied strictly, would operate against the very objects of the Society.—Be it resolved, that this Society recognises the necessity for obtaining an authoritative definition of the terms of Ordinance 19 of 1866, Section 6 ; if necessary by a short Ordinance, and requests the Board of Directors of the Society, to take such measures as may be needful for that purpose.

The thanks of the Society were given to Capt. Dadson for a copy of the Royal Navy List.

The Secretary read a letter from the Government Secretary with reference to Mr. Jenman's collecting specimens of the flowers, &c., of forest trees for the Society, stating that while His Excellency is willing that the Government Botanist should be available to the Society, he is not able to sanction the expenditure of public funds unless especially voted by the Combined Court. The letter was referred to the Board of Directors.

The Secretary read a communication from the Government, enclosing a circular from the Secretary of State for the Colonies, requesting information as to the best means of increasing the demand for Scotch cured herrings

and other fish in the colonies, which was referred to the Exchange Room Directors.

Mr. Davis asked whether anything could be said about the Country Exhibition.

The chairman replied that it was to be held at Buxton, and the Committee were trying to induce the people to interest themselves in it.

Mr. Quelch exhibited and made remarks upon some of the latest additions to the Museum, including a curious hairy, spider-like caterpillar; part of the skeleton of a shark: two species of plovers; some stone axes from the Rupununi; a block of manchineel wood; the skin of a Guiana otter; and also an Iguana with a second tail growing upwards.

The Vice-President remarked with reference to the Science Lectures that arrangements were being made for getting promises to fill up the list for the first six months of next year, the present list extending to December.

Mr. Vyle spoke of the desirability of members being allowed to admit their friends by tickets.

The Vice-President said that arrangements would be made for procuring tickets on which the names of friends to be admitted could be written, so that they would not be transferable.

The meeting then terminated.

Meeting held on the 18th October.—Mr. G. H. Hawtayne, C.M.G., Vice-President, in the chair.

There were 18 Members present.

Elections.—*Member*: Dr. W. F. Law.

Associates: John D. deWever and G. H. Pairaudeau.

The Chairman stated that Mr. Quelch, the Curator of the Museum had gone on a collecting expedition to the Abary Creek. Before leaving he had forwarded a letter from the Committee of Correspondence.

The Secretary read Mr. Quelch's letter in which it was stated that the date of the Buxton Peasant's Exhibition had been fixed for April 25th and 26th, 1889. Prize lists and posters had been prepared and printed, and would be sent out to the principal persons on the East Coast. Mr. Quelch also reported that the samples of colony woods had been prepared and sent to the Superintendent of Schools, Dwight, Illinois, and that the exchange specimens for the Californian Mining Bureau had been also forwarded.

The Secretary read a Report from the Exchange Room Directors in reference to the matter referred to them at the previous monthly meeting, viz., the request of the Fishery Board of Scotland, through the Government, for information as to the best means of increasing the demand for Scottish cured herrings and other fish in the colonies. The report was ordered to be forwarded to the Government Secretary.

Mr. N. Darnell Davis brought forward his motion, of which due notice had been given, to make certain alterations or additions to the Bye-Laws of the Society, so as to admit of the annual appointment of a Commercial Committee. Mr. Davis remarked that as this motion had been so long before the Society he would do nothing more than make it formally.

Mr. R. P. Drysdale seconded the motion.

The Chairman said he thought that the thanks of the Society were due to Mr. Davis for trying to add this

useful piece of machinery, which would be able to extend the usefulness of the Society to a very great degree.

The Secretary read an extract from a letter from Mr. W. Walker, in which, referring to the present motion, he said, "it appears to me to be a contributory step " towards the constitution of a Chamber of Commerce, " the expediency of which I have long recognised."

The motion was carried unanimously, and ordered to be duly advertised in the *Official Gazette*.

ROYAL AGRICULTURAL AND COMMERCIAL SOCIETY OF BRITISH GUIANA.

In conformity with Ordinance No. 19, Anno 1866, Chap. 13, the following additions to the Bye-Laws of the Society are published for general information :—

• • *Schedule A, Chap. XI.* •

5. There shall be a Committee to consist of not less than ten (of whom the Exchange Rooms Directors shall be three), and not more than twenty-four members of the Society, and to be called "The Commercial Committee."

6. Such Committee shall in the first instance be elected at a General Meeting of the Society, but shall have power to fill up vacancies in its own body, and to add to its number, subject to revision at a general meeting of the Society. The Committee shall thereafter be elected annually at the general meeting of the Society in December.

7. The Committee so elected shall, at its first meeting, appoint a Chairman, a Vice-Chairman, and a Secretary. At all meetings three members shall constitute a quorum.

8. The Commercial Committee shall endeavour to promote, as far as possible, the improvement of the trade of the Colony, and shall collect and disseminate information tending to develop and increase the resources of the Colony.

LUKE M. HILL, Hon. Secretary.

Georgetown, Oct. 20th, 1888.

Mr. Jacob Conrad brought forward his motion for the definition of the word "political," as it is used in section 6, of the Society's Ordinance of Incorporation, of which due notice had been given at the previous Meeting.

Mr. Conrad said that everybody knew the meaning of politics, but taken in its widest sense it covered a great many things, and if used dogmatically would prevent the Society from discussing many important matters connected both with agriculture and commerce. He did not believe that the object of the section had been intended to prevent agricultural and commercial matters being discussed, but he considered that such had been the result. As examples he mentioned that a motion of Mr. Julius Conrad, that the Society should petition the Court of Policy for certain alterations in the Marriage Laws, and also a recommendation of Mr. Walker that the Society should take the Boundary Question under its consideration, had both been ruled as "political," and therefore out of order. He considered that in consequence of the term not being properly defined, very little, if anything, had been done either for Agriculture or Commerce.

The Hon. B. H. Jones said that he had been indebted to the agricultural work of the Society for many things.

Mr. N. D. Davis said that he would second the motion for the purpose of discussion, because he thought there should be some expression of opinion on the part of the members. As the section stood he thought it a good one, the only fault was in the application of it. Sometimes the President applied it too narrowly, but in the case of the present head of the Society, Mr. Nind, they had his word that the term "political" should be very liberally construed as long as he held the office. It appeared to him (Mr. Davis) that what was wanted was something like the rule of the Colonial Institute, which prevented discussion of matters relating to *party* politics. We had

no *party* politics here, and it could then only mean that the Society would be prevented from discussing matters of Government Policy. He thought that if the term was defined, they might discuss many matters which had been hitherto prohibited by the cuckoo cry of "politics," coming from those who were not interested in the matter sought to be discussed. They should consider the matter in a liberal sense. Nobody wanted to upset the Government, and he thought that they might discuss matters of commercial importance as long as the Government did not declare them to be wrong in so doing.

Mr. Drysdale thought it very undesirable to interfere with the section in question. It had been found very useful in the past, and had prevented many undesirable discussions which might have done injury to the Society. There was no doubt that if this rule had not existed they would have been frequently called upon to discuss matters really political.

The Venerable Archdeacon Austin moved as an amendment, that, "A small Committee of the Directors be appointed to define the word "politics" as mentioned in the Ordinance, and to submit their definition to a general meeting, and on its approval, this definition shall be put on record to assist the ruling of any future President, should any such question arise."

Mr. Watt seconded the amendment.

The Chairman said there was a great deal in the old saying "Let well alone." The Society had worked under this rule for 44 years, and he did not know of anything in the circumstances of the Society, colony, or community, that rendered the discussion of this

question absolutely necessary. If the discussion of an agricultural or commercial question in a political sense should be desirable, there was a Planters' Association in the colony. If they allowed questions of a political nature or tendency to be introduced or discussed in the Society, he believed they would run a great risk of degenerating into a mere Debating Club. Perhaps it were well not to strictly define the term, but leave it to the good sense of the President for the time being, to define whether a question should be considered political or not, leaving to the members to support him if he were right, or correct him by a vote if necessary, should they consider him wrong. If matters had gone on well with the Society when it was larger and more prosperous than at present, they could do very well now without tinkering at the constitution.

The Rev. T. J. Moulder observed that the amendment assumed it to be generally agreed that it was desirable to have the term defined, but the question was whether a definition of the term, "political" was desirable, and he would move as an amendment to the amendment that a committee should be appointed to consider whether a definition of the word "political" was required.

The Venerable Archdeacon Austin said that with permission of his seconder he would withdraw the amendment in favour of Mr. Moulder's which he would second.

Hon. B. H. Jones supported the Rev. T. J. Moulder's amendment.

After some further discussion during which Mr. Tinne proposed an amendment which amounted to a direct negative, the motion was put to the vote and lost by a majority of 5, ten being against, and five for the motion.

The thanks of the Society were presented to Mr. A. Bouchereau for copies of the Louisiana Sugar Report.

The Secretary read an extract from Mr. Walker's letters in which that gentleman said :—" the Science Lectures are another cheering feature of activity in the intellectual progress of the community, and to this and all similar efforts, I honestly wish all possible success."

The meeting then terminated.

Meeting held on 15th November.—Mr. P. H. Nind, M.A., President, in the chair.

There were 10 members present.

Elections.—*Members* : Drs. M. G. Pereira and N. E. Edghill, and Rev. D. E. McDonald.

• *Associates* : Messrs. G. Hyslop, F. A. Viret, C. F. Jacelon, W. H. Curtis and E. M. Garnett.

The President stated that before taking up the business of the day, it was his duty and a right thing to mention the death of an old member of the Society, Mr. R. W. Imlach. All of the members would regret and feel his loss when they thought of him as having been among them or in the colony for forty or fifty years. He had left his mark, and a record which it will be well for others to follow, for integrity, uprightness, straightforwardness and clearness of judgment. He (Mr. Nind) thought that it would be the wish of all the members of the Society that it should be recorded on the minutes that they valued the memory of Mr. Imlach and condoled with his relatives in his loss.

The Secretary informed the meeting that the contract

for the extension of the Society's premises had been given to Mr. Pooler, and that the work would be supervised by Messrs. F. A. Conyers and L. M. Hill. The contract gave three months for the execution of the work but he hoped it would be finished in less time than that.

The Secretary read a letter from Mr. Quelch, Secretary of the Committee of Correspondence, to the effect that Prize Lists of the Buxton Exhibition and new posters had been distributed throughout the colony.

Mr. N. D. Davis asked that the attention of the members be drawn to the fact that the next meeting would be that for the election of officers, and he hoped that as many as possible would be present to show their interest in the election.

The President said he would be happy to do as Mr. Davis suggested ; he thought that all the members should be interested in the election of office-bearers for the ensuing year. He hoped the attendance at the next meeting would be large.

Capt. E. T. White asked permission to speak on the Banana Industry. He thanked the Society for recommending his petition to the Combined Court and stated they were all aware that \$25,000 had been voted by that Court. He had written to his correspondents in Boston giving them information of that vote, but had not as yet received any answer. The amount was so ridiculously small that he should not wonder if they put the letter aside and thought no more about it. They all knew what Jamaica had done, giving £5,000 a year for five years, and what had been the result ; and he was confident that if the Government here would be liberal, there would be an increase in the revenue as well as an

enormous addition to the wealth of the colony. This matter was one of the great questions of the day, and he would be grateful if the Society would give it their consideration, and do all they possibly could to start it. He had been buying oranges lately and hoped next year to be able to start the shipment of this fruit in large quantities.

In reply to questions of the Secretary and Mr. N. D. Davis, Captain White said that the last shipment of oranges had gone to Bermuda, and that he had bought them at 36 cents per hundred.

The President said that he believed in the capability of this country for growing oranges. The Society would always have an interest in Capt. White's attempts to establish a fruit trade, and would help his efforts in every way possible. Very much depended on the Government, but there was unfortunately just now a deficit in the revenue; however, he would say "do not be daunted" if results did not come at once. It takes time in this colony for ideas to mature, but he thought they were ripening now.

The meeting unanimously agreed to support Capt. White, and on the suggestion of Mr. N. D. Davis, the Secretary was directed to the proper persons in Jamaica and Dominica for information as to the packing of oranges and other fruits for shipment.

The Secretary read a letter from Dr. Ernst, Caraccas, asking for copies of *Timehri*, and forwarding Report of Exhibition at Caraccas. It was directed that Dr. Ernst be put on the List of Correspondents to whom free copies of *Timehri* are sent.

The meeting then terminated.

Meeting held on 20th December.—Mr. P. H. Nind, M.A., President, in the chair.

There were 21 members present.

The Secretary reported having written for information as to the packing of fruit for shipment, to Dr. Nicholls, Dominica, and to the Secretary of the Chamber of Commerce, Jamaica.

The President stated that in anticipation of to-day's election of Officers, a meeting of the Directors had been held on the Monday previous for the purpose of selecting the names of members considered suitable for nomination as office-bearers and members of Committees. These names would be merely recommended, and the list must in no way be considered as being dictated by the Directors. If any member took exception to a nomination he could call attention to it, and a ballot could then be taken.

As President, Mr. G. H. Hawtayne was nominated. Mr. D. C. Cameron in proposing that gentleman said that it had always been customary to elect the Vice-President to the highest office in the Society, for the next year. Mr. Hawtayne had devoted so much time to the benefit of the Society, that he (Mr. Cameron) had much pleasure in proposing him.

The proposition having been duly seconded by Mr. R. P. Drysdale, was carried unanimously.

Mr. Hawtayne in thanking the Society for the honour they had done him, said that he would do his best with the kind assistance of the officers of the Society, and he hoped that at the end of next year they might be able to say he had not done so very badly.

In nominating Mr. D. C. Cameron as Vice-President,

the chairman said that it had been suggested that Mr. M. Garnett would be a fit and proper person for the office, as he was largely interested in almost every interest in the colony ; but as he was leaving in March or April, it was thought better that another name should be substituted, and therefore he had great pleasure in naming Mr. Cameron.

Mr. Cameron was then duly proposed by Mr. G. H. Hawtayne, seconded by the Revd. Canon Castell, and unanimously elected.

In proposing that Messrs. Luke M. Hill and F. A. Conyers be re-elected as Honorary Secretary and Honorary Treasurer respectively, the chairman said he believed that these gentlemen had consented to continue their services to the Society. He thought that they deserved a vote of confidence.

Mr. Hawtayne seconded, and said he had much pleasure in bearing testimony to their good services.

These gentlemen having been unanimously re-elected, Mr. Hill said that he had intended to decline, as his time was so much occupied ; but as the Society had re-elected him he would do his best with the assistance of Mr. Rodway to perform the duties of the office. Mr. Conyers briefly thanked the meeting for re-electing him.

The Ordinary Directors, as per annexed list, were then proposed by the chairman and seconded by Mr. L. M. Hill, and duly elected.

The Managing Directors, as per list, proposed by the chairman and seconded by Mr. G. H. Hawtayne, and the Exchange Room Directors, proposed by the chairman and seconded by Mr. D. C. Cameron, were both elected.

The Resident Director in London, Mr. W. Walker,

proposed by the chairman for re-election, seconded by Mr. G. H. Hawtayne, was also declared elected.

The Agricultural and Commercial Committees, as per list, proposed by the chairman, the first seconded by Mr. Jacob Conrad, the second by Mr. S. Vyle, were duly elected.

The Committee of Correspondence, as per list, proposed by the chairman and seconded by Mr. Luke M. Hill, and the Book Committee proposed by Mr. Jacob Conrad and seconded by Æneas D. Mackay, were also elected.

The President then delivered the following address giving a *resumé* of the work of the Society during the past year :—

“ You did me the high honour a year ago to elect me President of this Society, an honour I greatly appreciated, but had I known at the time that circumstances would have led me away from the colony for half the year, I should have paused before accepting your flattering nomination. It is, however, a consolation to me when I reflect that though my personal connection with the Society was temporarily suspended, my place was filled to the fullest extent by our esteemed Vice-President, who, actuated by a fine sense of the duties that devolved upon him, has given his energies in various ways to promote the interests of the Society, presiding at the monthly meetings and at the Popular Science Lectures unflinching with that *bonhomie* and *savoir faire* which distinguish him.

It is often worth while, in the case of institutions as well as of individuals, to glance back over the year that is gone and count the losses and gains

and see if a better position has been secured—in parliamentary language, report progress. As far as the transactions of the Society go, the record of the past twelve months, though not conspicuous by startling events, is at any rate respectable and marked by a progressive movement, of which I will take a brief survey from our present coign of vantage.

The Society has sustained losses in the death of old members who have earned distinction in the records of the Society and whose names will not readily be allowed to pass away. I allude to Mr. Wm. Russell, the Revd. J. Foreman and Mr. R. W. Imlach. Besides losses by death, from which we can never be exempt, there are other losses which I sincerely trust will be in the main but temporary; I refer to the losses sustained by the non-payment of annual subscription, and which, being found to be on a large scale, caused the enforcement of Section 1, Chapter 7, which treats of members in arrear. After a period of laxity many took offence at being firmly applied to for the payment of arrears—but I think on dispassionate reflection these gentlemen should understand that no favour has been shown, the rule having been impartially enforced against all who were in arrears, and that there was no other course open to the Directors but to put an end to a state of indebtedness which was manifestly unjust to the majority who paid regularly, which crippled the power of the Society, preventing the adoption of useful measures, and in a word threatened its very existence. No one should take umbrage at the substitution of a business method for a lax one, and so I hope there are many who will return to their former position in

the Society, as provided for in Section 2 of Chapter 7. I am aware that some whose names had been expunged from the books of the Society, have had their names replaced.

The Society commenced this year with a smaller balance than in 1887, which was chiefly due to the settlement of a heavy debt incurred in the first issue of *Timehri*, the re-arrangement of the Library and the new catalogue—items not likely to recur.

On the credit side of the account to balance losses, it may be claimed that the administration of the Society's affairs is established on strict business principles and that financially the tone is healthy. • ~

The former Librarian, Mr. Crumpton, retired at the beginning of the year, which opened the way to a better arrangement, whereby our indefatigable Secretary, Mr. Luke Hill was relieved of some of the more irksome work of his post, and we secured the services of Mr. Rodway as Assistant Secretary and Librarian, a gentleman of literary tastes and special knowledge, and one who has shown himself possessed of some exceptional qualifications.

Another item on the credit side has been the extension of the Society's lines in a new direction, which was a happy thought of the Vice-President. I refer to the Popular Science Lectures talked about for a long time, but now an accomplished fact. It is surprising what a quantity of latent scientific talent is being opened out by these lectures, and from the number of persons who attend them, it is manifest that a widespread interest has been excited. I am disposed to think that lectures on other topics besides *Science* might be advantageously ad-

mitted, for instance let every other lecture be scientific and every other literary, or on general topics: unless some such plan is adopted, I am afraid the scientific men of the colony will find the burden laid upon them too heavy to bear.

Another gain will be the extension of the reading room southward. When that improvement is completed, of which there is an immediate prospect, there will be more room for the library which has long been needed; and it is to be hoped that a room for monthly meetings of the Society and a ladies' room will not be forgotten. I do not know, however, that these improvements appear on the plan, and our Treasurer will not, I know, permit extravagant inroads to be made on the funds of the Society. The Society owes a large debt of gratitude to the Treasurer and Secretary for the services they have spontaneously rendered out of pure good will furnishing the plans and supervising the contractor and his work, whereby expense has been saved; and we all feel assured that only good workmanship and material have been put into the building.

Another item on the credit side has been the introduction of *gold* to the notice of the Society, through 'Gold Mining Notes' compiled for *Timehri* by the Vice-President from the Reports of the State Mineralogist of California, and through a valuable collection of auriferous quartz and other ores from California received in exchange for specimens of colonial woods—which ores are to be seen in cases in the Museum. If one may dip into the future not far distant, one may readily imagine that the appearance of these foreign minerals on the scene is but a foreshadowing of other cases and cabinets filled with

glittering specimens of native quartz and of ores of mercury, of silver and of copper, with various other minerals, testifying to the development of the mining industry in British Guiana, and of the encouragement given by this Society to its followers.

The Society at its June meeting looked favourably on Capt. White's banana trade, and just before the sitting of the Combined Court, gave his proposals entire support ; so that although the scheme lacks the full financial aid necessary to bring it to an issue, it is well on its legs, and I am confident will command the support of this Society until it becomes a substantial reality.

From the Fruit Trade I pass easily to the recorded opinion of the Agricultural Committee which is decidedly adverse to the undertaking of experimentalising with new products at the expense of the Society. I believe on this point the members of the Committee are quite unanimous, and they are also unanimous in thinking that all such experiments should be made where the Government have control of the machinery, viz., the Botanic Gardens, and that their recommendations adopted by the Society should be carried out in the Botanic Gardens under the Government Botanist and Directors chosen from the Agricultural Committee. In former times liberal members of this Society would on the estates under their charge give a trial to new varieties of sugar cane and to other plants of economic value, but for obvious reasons this is not a good plan where a public institution exists for this very purpose, and where skill and means are in combination to give every chance to cause fair and exhaustive trials to be made.

It appears to me that the only way in which the

purely agricultural side of this Society can be kept *en évidence* is through benevolent co-operation between the Society, the Government, and the Government Botanist, the very first step to be urged on the Government being to attend to the proper drainage of the Gardens which has been so unaccountably neglected during the last 9 years. I believe these are the convictions of several, if not of all, members of the Agricultural Committee and I think it is a decided gain that they have arrived at the fixed determination not to be parties to any expensive planting experiment to be wholly or partially defrayed out of the Society's funds, whereby time and money would be lost, and a fruitless result would be the outcome. Discussion is often pronounced barren, but the discussions of the Agricultural Committee have led to the threshing out of a subject, which was prolific of fallacies, to a practical issue.

It is time now to take a new departure, and I heartily commend this matter to the consideration of the incoming President.

The commercial aspect of the Society is decidedly looking up, and Mr. Davis's Commercial Committee having been appointed, it only remains now for the members to act when occasion requires. This has been a bold thought and I hope success will prove it to have been a happy one: it rests with the commercial community to make it or mar it. If it be too early for the colony to have a Chamber of Commerce, this Committee might at any rate be the nucleus of one, whereby the status of the colony in its outside relations would be much enhanced.

We have not had many papers read at the monthly

meetings this year, but those contributed were of a practical tendency, especially Mr. Skekel's paper supplemented by his working model of a cane mill on new principles, which created a healthy discussion.

The amount of money now being spent annually on periodicals and newspapers is at least worthy of notice, and this expenditure is on the increase.

In the statement of receipts and expenditure submitted by the Treasurer at the beginning of this year for the year 1887, the entries run :—

Cost of Magazines, Newspapers, &c	...	...	...\$1,347 90
„ New Books added to Library	...	...	... 674 04

This discloses a state of things which in my opinion is not very satisfactory, and I daresay some will disagree with me when I say it is a grave mistake which should be rectified; but at any rate, if it be the opinion of the majority that no change should be made, it is better they should decide so with their eyes open than drift blindly into it. Double the amount is spent on ephemeral literature to that which is spent on standard works, as appears by the figures; but it is not to be supposed that the whole or half of the \$674 is laid out on solid books such as the library ought to possess; the greater part goes to purchase novels, good, bad, and indifferent, and books of a light description.

If these same lines are to be continued, the Society will lose ground on its serious and educational side to the detriment of every one, but especially to the detriment of its more youthful members and of those who depend upon its shelves for their only literary pabulum.

I turn now with much pleasure to the Museum, which is a mine of information to a Natural History student

and an interesting place for anybody to spend an occasional half-hour in. I would remark upon the large improvements made this year in the arrangement of specimens and in the addition of fresh objects of interest. By a judicious interchange with the British Museum authorities, the excellent Curator has lately obtained some specimens of great value ; and it is a source of perplexity even to his ingenuity to find some space where the recently added specimens may be displayed advantageously without displacing old familiar features.

It is a fact which must be faced before long that the dimensions of the Museum are becoming too cramped for its contents : the egg shell can no longer contain the chicken which is daily growing too large for it. There is no proper room for the Curator, nor any place where he can prepare his specimens. A gallery round the interior has been proposed, and would, at a moderate expense, add considerably to the capacity of the structure ; but I think it should be borne in mind, if the Museum is to keep pace with the times and do justice to the colony and to the labour of its present zealous Curator, a more ample and convenient building will have to be provided within a year or two. Many will remember when the Museum had a somewhat neglected air and the disposition of its contents was not all that could be desired, but I think it may be fairly claimed under its present intelligent management as an item of magnitude on the credit side of the Society.

We may also congratulate ourselves that the editing of *Timehri* has fallen into such capable hands. I am personally aware that the Editor gives a great deal of care and attention to this work, and has succeeded in

reaching a high standard, which all will acknowledge who know the difficulties that have to be surmounted before the current number is sent to the printer. A word of recognition is also due to the same gentleman, for his learned little disquisitions on natural objects exhibited occasionally at the monthly meetings. These brief but pleasant episodes form attractive breaks to the regular business of the meetings and are much appreciated by many, doubtless adding a general interest to the proceedings of the Society with which they are identified.

Gentlemen, I think I have shown that the balance is on the right side, there ~~is~~ a score to the credit of the concern ; but the Society is still in a transition stage and requires well directed effort to keep it, in all its many aspects, well on the path of progress. I think a wise selection of officers for 1889 has been made, and I have no fear but that under the guiding hand of our President-elect, an exceedingly good record will have been written in twelve months from to-day.

Seeing how much, to use an Americanism, he has bossed the machine this year, he will feel like President Grant when he entered on his second term of office, and you too will feel that you have an experienced pilot at the helm.

I am exceedingly obliged to you for your patience in listening to my *résumé* of the transactions of the Society during the year of Grace, 1888.

The Secretary then read the following extract from one of Mr. Walker's letters :—

I am glad to note that the Society is disposed to take a more liberal view than heretofore of the scope of topics for discussion at its meetings. It seems to me by no means difficult to draw a line at discussions which

might lead the Society to take a political *party* side in lieu of conforming to the fundamental principle of neutrality on all such questions. I regard the adoption of Mr. Darnell Davis's resolution for the appointment of a Commercial Committee as a distinct step in advance. The Quarantine Regulations question is also one of practical importance, and so far as I am qualified to form an opinion, my impression is that the Conference has been most successfully conducted. I regret to learn that the colony has suffered so severely from drought, but hope this may stimulate the suggestion of precautionary measures to modify, if not altogether prevent the occurrence of similar calamities in future; also that the slight fall of rain which preceded the date of your letter may have been but the precursor of a larger supply.

The Chairman proposed a vote of thanks to Mr. W. Walker, the Resident Director in London, for having given his time and energy in selecting books for the Society and promoting its interests generally. The vote of thanks being seconded by Mr. G. H. Hawtayne, was unanimously carried.

The President said that he believed all would concur with him in sending to Mr. Walker through the Secretary their best wishes for the coming year.

The thanks of the Society were given for the following donations :—

Mr. P. H. Nind, Portraits of Sir P. E. Woodhouse and Sir Wm. Snagg.

Dr. Anderson, The Piccaroons.

Dr. Macnamara, Tubercle Bacillus.

Secretary of Quarantine Conference, Report of Proceedings.

Mr. G. H. Hawtayne proposed what he said was customary at the last meeting of the year, to give the thanks of the members to the outgoing President and Officers for their valuable services. He (Mr. Hawtayne) thought that they all much regretted the absence of the President for a portion of the year, and he especially did so because he considered that the business had been conducted in an admirable way when he presided. The

people owed a debt of gratitude to Mr. Nind for the great interest he had taken in all belonging to the colony, especially in his attempt at colonising a large tract of land up the Berbice river, from which, if he should be successful, the colony would derive great benefit; and he hoped also that Mr. Nind himself would find it profitable. They were all indebted to the President for his services, and he had therefore great pleasure in proposing a vote of thanks.

The Ven. Archdeacon Austin in seconding the motion thanked Mr. Nind for his lucid *resumé* of the Society's work during the past year, to which he had listened with great interest.

The vote of thanks having been heartily carried, the President thanked the meeting for the exceedingly kind way in which his services had been referred to. With regard to his interest in the colony, he hoped that a year hence it would be greater than now. He had to thank the Legislature of this colony and every one connected with the grants of land in Berbice, for the liberal way they had behaved. He hoped to give them the results in two or three years, and whoever should be President at that time, would perhaps be glad to hear that something had been done to open up the country.

The President then proposed a hearty vote of thanks to the Treasurer and Secretary for their services generally, and especially for their supervision of the extension of the Society's Building. The Treasurer had done a great work in enforcing rules at the right time so as to relieve the Society from what was almost a state of anarchy. They all knew that the Secretary was inde-

fatigable in his services, and in his regular attendance at every meeting.

Rev. T. J. Moulder seconded the motion, which was duly carried; and Messrs. Conyers and Hill thanked the Meeting.

The President moved that a vote of thanks be given to the Vice-President who had occupied the chair during his (Mr. Nind's) absence, and had never failed in his attendance at the meetings. They had also to thank Mr. Hawtayne for his services in connection with the Popular Science Lectures.

Mr. S. M. Bellairs in seconding the motion, mentioned that his opinion of the Lectures agreed with that of the President, that they should include other than scientific subjects.

The motion, having been carried, Mr. Hawtayne said he was very much obliged to them for their recognition of what he had been able to do for the Society. With regard to the Lectures, the arrangements for the coming year included the following:—

January	Revd. Canon Castell.....	Music.
February	E. F. im Thurn.....	Ethnology.
March.....	E. E. H. Francis.....	Chemistry.
April.....	Revd. I. Scoles.....	Ornamentation.

The meeting then terminated.



Election of Office Bearers for 1889.—The following were elected:—

Patroness :

THE QUEEN.

Vice-Patron :

THE RIGHT HONOURABLE VISCOUNT GORMANSTON, K.C.M.G.,
GOVERNOR AND COMMANDER-IN-CHIEF, &c., &c., &c.

President :

G. H. HAWTAYNE, C.M.G., F.R.G.S.

Vice-President :

D. G. CAMERON

Managing Directors.

R. P. DRYSDALE

H. KIRKE, M.A., B.C.L.

W. S. TURNER.

Ordinary Directors :

S. M. BELLAIRS

N. D. DAVIS

M. GARNETT

HON. B. H. JONES

R. J. KELLY

P. H. NIND, M.A.

Exchange Room Directors :

A. G. CLARKE

A. WEBER

C. WEITING.

Honorary Treasurer :

F. A. CONYERS.

Honorary Secretary :

LUKE M. HILL, C.E.

Agricultural Committee :

R. J. KELLY, *Chairman*HON. B. H. JONES, *Vice-Chairman*GEO. GARNETT, *Secretary*

ROBT. ALLAN	A. R. GILZEAN
GEO. BAGOT	E. C. LUARD
HON. A. BARR	E. MONRO
S. M. BELLAIRS	T. MULLIGAN
A. BRAUD	P H NIND, M.A.
R. B. BUTTS	JAS. SMITH
D. C. CAMERON	WM SMITH
B. R. CLARKE	HON. W A. WOLSELEY
JAS. B. FINNEY, C.E.	J. MONKHOUSE
J. M. FLEMING	

Commercial Committee :

J. E. TÏNNE, *Chairman*A. WEBER, *Vice-Chairman*WM. CUNNINGHAM, *Secretary*

HON. A. BARR	M. GARNETT
B. S. BAYLEY	T. H. GLENNIE
W. W. BIRCH	FERRIS GRANT
D. C. CAMERON	E. McLEOD
A. G. CLARKE	JOS. TENGELY
JACOB CONRAD	JAS. THOMSON
J. J. DARE	JAS STUART
J. H. DE JONGE	C. WEITING
R. P. DRYSDALE	E. T. WHITE
J. P. FARNUM, JUNR.	

Committee of Correspondence :

D. C. CAMERON, *Chairman.*HON. B. H. JONES, *Vice-Chairman.*J. J. QUELCH, *Hon. Secretary.*F. A. CONYERS, *Treasurer.*

HIS HONOR N. ATKINSON	FERRIS GRANT [F.R.G.S.]
GEO. BAGOT	G. H. HAWTAYNE, C.M.G.,
S. M. BELLAIRS	G. S. JENMAN, F.L.S.
A. BRAUD	R. J. KELLY
E. E. H. FRANCIS, F.C.S.	H. KIRKE, M.A., B.C.L.
M. GARNETT	GEO. LITTLE, JUNR.

C. H. G. LEGGE
F. A. MASON
P. H. NIND, M.A.
G. B. STEELE

A. SUMMERSON
W. S. TURNER
S. VYLE

Curator of Museum: J. J. QUELCH, B. Sc.

Book Committee:

DR. ANDERSON
HIS HONOR N. ATKINSON
VEN. ARCHDN. AUSTIN, M.A.

E. H. G. DALTON

R. T. A. DALY

N. D. DAVIS

J. B. FINNEY, C.E.

E. E. H. FRANCIS, F.C.S.

GEO. GARNETT

FERRIS GRANT [F.R.G.S.]

G. H. HAWTAYNE, C.M.G.,

HIS HONOR H. KIRKE, M.A.,
C. H. G. LEGGE [B.C.L.]

REV. T. H. MOULDER

P. H. NIND, M.A.

J. A. POTBURY, M.A.

EXLEY PERCIVAL, B.A.

REV. W. B. RITCHIE, M.A.

HIS HONOR W. M. SHERIFF

E. J. N. THOMAS

W. T. WALTHALL

F. A. R. WINTER

Librarian and Assistant Secretary: JAMES RODWAY, F.L.S.

Resident Director in London:

WILLIAM WALKER, 48 Hildrop Road, Tufnell Park, N.

Popular Science Lectures.

2.—“PHASES OF ANIMAL LIFE, PAST AND PRESENT.”

*Delivered on Tuesday, June 12th, by F. F. Quelch, B. Sc., Lond.,
Curator of the Museum.*



HE lecturer began with a brief and general account of the classification of animals into their great groups, which were particularised as the main phases of past and present life, attention being drawn to the dominant classes and orders which characterised the various epochs in past ages. The evolutionary pedigree of animals, under the form of a genealogical tree, was traced, determined by the structure of the various types, and as confirmed by their development and embryological history, the transitional stages between the chief groups being briefly indicated and explained. A brief survey was taken of the chief features of the geological history of animals; and the gradual increase in complexity of organisation from the early palæozoic to modern times was insisted on as supporting the derivation of the higher forms from the lower by a process of natural selection, by which the fittest for survival, out of a continuously varying series, under varying conditions of environment, were progressively modified. The evolution of the modern horse from its five-toed ancestors was briefly stated as a perfect instance of such modification, the proofs of which, based on every intermediate condition as found in strata in the Old and New Worlds, are indisputable. The appearance of man in the geological series was briefly referred to, the scarcity of his remains being explained

by the fact that the districts inhabited by him during the vast period of the glacial epoch, are now sunk beneath the sea—these lands being originally laid bare by the locking up, in the form of the ice of the great Ice Age, of a quantity of water that would cause a depression of the level of the sea of nearly two thousand feet, and which lands became again submerged by the melting of the ice at the end of the glacial period. The probable origin of life during the early ages of the earth under unique thermal conditions, and the probable differentiation of the animal and the vegetable organisms, were suggested; and it was insisted on that, considering the history of the evolution of animals as based on the increasing complexity of organisation from the lowest to the highest types, the highest in their development presenting a summary, so to speak, of their ancestry, and considering the geological record that, as the ages of the past rolled by, new and higher types of animals successively appeared, it was to be inferred that, in the far distant future, when this present period would be, in the history of the earth, but a past geological age of high antiquity, a race of beings would be found upon the earth, as superior to the species "man," as man is at the present to the lower types.

The lecture was illustrated by a large collection of diagrams and prepared specimens, shewing the chief types of, and the transitional links between, the various classes and orders of the Animal Kingdom.

3.—“COLLECTING OLD AND NEW, AS CONNECTED WITH SCIENTIFIC PROGRESS”

*Delivered on Tuesday, 17th July, by James Rodway, F.L.S.,
Librarian and Assistant Secretary to the Society.*

The lecturer gave a sketch of the progress of collecting from early times to the present. Without collecting and collections, science could not verify its deductions. The history of collecting manias coincides with the development of all the sciences. First came the dark age when everything was copied from some musty old manuscripts, and the only question was, who is your authority? The collector had not yet come to the front, except in the shape of the book lover. The antiquary and virtuoso arose and dragged science up to a higher level, by bringing facts to bear on the dicta of Aristotle and Pliny. With the discovery of new regions came specimens of which no description could be found in the classics. Then rose the universal collector who published the results of his researches in ponderous folios under such names as “Natural Histories” and “Great Wonders.” Finally came the age of the specialist when the facts and materials of science became too great for one man to do more than glean a small portion in his life-time; he therefore took up a particular section, or even a small portion of one. This last period is that in which we are living, but it has had a stage which may be termed that of the closet naturalists, which is being gradually replaced by that of the worker in the field. The last generation examined dry bones, the present aims at the discovery of the way in which organic beings live. Scientists are all collectors, every specimen is a fact; from facts systems are built up, and theories dis-

covered by which to arrange them. Theories are necessary, otherwise there would be no order, but these never attain the position of dogmas. Every theory is a step by means of which a greater field of observation is attained; the scientist does not despise the abandoned theory when he finds one better. Some curious particulars as to Museums of the "olden time" and some of the objects to be seen in them were then given, and some of the forms of what has been called collecting manias were described. The Bibliomaniac of old, collected books but never read them, the Bibliophile of the present day prizes them for their contents. The Zoologist collects bird-skins, eggs, shells, butterflies &c.; he has a very wide field, and his collections are often very beautiful. The Botanist finds his specimens amidst the most lovely scenes, on rocks, mountains, and sea-shores, or growing in the crevices of ruined castles and abbeys. The Microscopist picks up some of his most beautiful living objects from filthy-looking stagnant pools and ditches; he above every other collector sees the operations of life through the transparent skins of the inhabitants of what to others is an unknown world. The Geologist picks up old stones and bones and finds out the wonderful story of the earth's past. The Archæologist is omnivorous, nothing is paltry in his eyes, he goes hand-in-hand with other scientists trying to build up man's past history. The old idea of history is effete, the Archæologist ushers in a new record, which may be wanting in dates, but is none the less history, even though it may be called prehistoric. One of the latest developments of the so-called mania is stamp-collecting; at first sight it appears useless, but there is a

great deal of modern history and geography to be gleaned from it.

Most persons have a hobby of some kind, and it would be well if everyone should have some pursuit apart from his business as a relief and relaxation. Hobbies are apparently the outcome of a development of the higher faculties. They serve to educate, to bring into play habits of observation, and to make men better and nobler as they appreciate the world and its beauties. The man who thinks of the earth only as a place of sin and misery is to be pitied. Such a person in condemning the work, blames its mighty architect. With such a disposition he becomes soured and peevish, a burden to himself and all around him. The man with a hobby on the contrary, is genial, kind and good tempered, finding pleasure everywhere. His excursions have an object and are therefore always agreeable, even when he has to endure fatigue and privation.

4.—“HEALTH IN THE TROPICS”

*Delivered on Tuesday, August 14th, by Dr F. E. A. Ferguson,
Government Medical Service*

The lecturer began by reminding his audience of the importance of studying and conforming to the rules of tropical hygiene, which were especially important to Europeans who were not naturally adapted to the climate. He then gave a rapid sketch of the various functions of the body in health, laying especial stress on that which regulates the heat of the body under the varying conditions of the atmosphere. He pointed out the adaptation of the European to a cold, and the Negro to a hot climate, and

shewed how the former, in coming to the tropics, subjected the heat-regulating function of his body to a struggle for accommodation to the unaccustomed surroundings, which frequently ended disastrously.

It was pointed out that only a small quantity of food is required in the tropics, especially by people of sedentary habits; and reference was made to Dr. PARKES's opinion that alcoholic beverages are particularly hurtful in the tropics. Exercise should not be neglected, both for the body and the mind. Houses should be built larger, and in situations freely exposed to the sea-breeze, to secure coolness during the hot hours. Cool light clothing should be worn during the activity and heat of the day, and warm (flannel) coverings used during the cold and dampness of the night. Special stress was laid upon the importance of protecting the body against the cold night air; and it was strongly insisted on that the great contrast between the atmospheric state of the day and night in the tropics, is the essential climatic condition against which it is necessary to struggle; and the body should be protected not only against the heat of the day, but also and especially against the opposite conditions that obtain at night. Full exposure to this diurnal fluctuation in the atmosphere resulted in an unstable condition of the heat-regulating function of the body, and impressed the system with a proclivity to periodic disturbance. This is the predisposing cause of most of the sufferings commonly attributed to tropical climates.

5.—“THE METAMORPHOSES OF MATTER.”

*Delivered on Tuesday, September 11th, by E. E. H. Francis, F.C.S.,
Government Analytical Chemist.*

The lecturer commenced by pointing out the existence of the two great principles, matter and force, in the universe, and the various forms under which they were recognisable, together with their relations to one another. The indestructibility of matter and force was then touched upon, and the various methods of their modification shewn; and it was pointed out that beyond even the knowledge of the conversion of one kind of force into another, their equivalents, were also ascertained; and with the conception of the “unity of forces, came the conception of the primary force as motion. Detailed description was then given of the solid, liquid and gaseous conditions of various forms of matter, and the methods of their transformations explained with reference to the molecular constitution or condition of the matter acted upon, and the force of cohesion. The various kinds of matter were referred to, and it was pointed out that the various kinds commonly distinguished were chiefly compounds, really reducible to but few simple kinds, known as elements, of many of which various allotropic modifications were known with correspondingly different properties; and it was to be inferred that the various simple kinds of matter were but modifications of one primary form.

The lecture was illustrated by diagrams and by a large series of experiments on the transformation of forces and of the three conditions of matter, on the reduction of compound to simple bodies, and on the allotropic modifications of various elements.

6.—"TIME AND TIME-MEASURERS."

Delivered on Thursday, October 19th, by E. A. Pairaudeau, Government Surveyor.

The lecturer commenced by giving concise definitions of the two portions of his subject, and shewed the necessity for his entering into, and dwelling somewhat minutely on, that part of the science of Astronomy which treats of the motions of the celestial bodies. During the course of this part of the lecture, the details of the various periods of Time, such as the Sidereal day, the Apparent day, the Mean Solar day or the great standard of Time, the week, the month, the year—Sidereal and Tropical—were entered into, and an explanation given of the use of the transit instrument. One of the various methods used—the celebrated pendulum experiment of LEON FOUCAULT—to prove the earth's rotation was described, and a reference made to the estimate of LAPLACE and later Mathematicians, as to the uniformity of the earth's diurnal motion during the last 2000 years. A comparison was made of this spinning earth as the sole occupant of the infinitude of space, with its actual position with reference to the subject at issue; and the cause and effect of certain disturbances variously known as Precession of the Equinoxes, Nutation and Perturbation, which affected considerably the apparent motions of the celestial bodies, were considered. The meaning and the use of the Equation of Time were explained, special reference being made to the wonderful, almost prophetic, accuracy of the Nautical Almanack, and to the manner in which Astronomers in charge of Observatories obtain the correct time. The difference of time

also in different longitudes was touched on, together with the curious result, consequent on the invention of the Telegraph, of often hearing news from eastward countries apparently before it happened, and this led to the discussion of a late American fad, the question of "Universal Time."

A historical account of the creation of the Calendar was given and of the vicissitudes which it has since undergone.

The subject of Artificial or Mechanical Time Measurers was then taken up, and it was pointed out that, as Nature did not furnish any means of measuring accurately the smaller divisions of Time, man had to exercise his inventive genius to supply the want which the progress of civilisation necessitated. The various means that have been, or are being used for the purpose were thereupon noticed, and the principle of each explained, notably:—The Clepsydra, the Sun Dial, the Hour-Glass, the Pendulum Clock—Sidereal and Mean-time, and lastly the Ship's Chronometer.

Attention was called to the vote of £30,000 by Parliament for a good ship's clock, and the fact of the prize having been won by an Englishman. Reference was made to the rough observations in point of Time in the days of PROLEMY as compared with the extraordinarily accurate observations of the present day, and an explanation was given of the indispensableness of the clock in connection with the great question of Longitude.

The Astronomical portion of the lecture was illustrated by diagrams, and the more practical part by the various chronometric instruments referred to,

7.—"ELECTRICITY AT WORK."

Delivered on Thursday, November 29th, by Samuel Vyle, Government Electrician.

The lecturer remarked at the outset that whilst the ancients knew that rubbed amber would attract light substances, and that the merits of the loadstone were known long ago, yet down to VOLTA'S time, the world was without the knowledge of what might be termed "controllable" electricity. The fact afterwards became known that a current of electricity passed through a wire, affected a magnetic needle close to it. Then ARAGO and DAVY discovered how to magnetise iron and steel, which resulted in the electro-magnet by which the majority of the telegraphs of the world are worked to-day. Soft iron under the influence of an electric current became magnetised, but the property was lost with the cessation of the current, and it was this fact that was utilised in telegraphic work. Very different was the action of the current upon steel—it would not "let go" but retained the magnetism. The Morse Instrument was then described, and also the single needle, so much in use upon the British Railways. Reference was then made to telephone work generally; and, under the head of electric lighting, a description of the working of a dynamo was given. The principles of arc lighting and the incandescent lamps were then briefly pointed out, and it was stated that from experience of the labour at command on estates in the colony, arc lighting was not to be recommended for buildings, as these required care and skill daily, beyond the ordinary character; whereas the incandescent lamps burnt as long as the

filament of Carbon lasted—often 1000 to 7000 hours ; and they could now be got to give from a single candle power, to 1000. The mechanical applications of electricity were then touched upon, and it was pointed out how waterfalls and windmills could do good work in connection with Storage Batteries, which were explained. The probable development of electric applications were referred to, showing that the ten million people, workers and their connections all the world over, in electricity generally, including electro-plating, welding, manufacturing, &c., had a busy future before them.

The lecture was illustrated by the various instruments referred to, and experiments performed in connection with the principles of the telegraph, the modes of electric lighting and the applications of electricity to mechanical work. Telegraphic communications were made with New Amsterdam, Leguan and Trinidad, and messages were sent and received.

8.—“THE UTILISATION OF WASTE SUBSTANCES.”

*Delivered on Thursday, December 29th, by Luke M. Hill, Bsc. Eng.,
Town Superintendent, Hon. Secretary to the Society.*

The first part of the lecture was devoted to the utilisation of waste, from mining operations and manufactures, which with the exception of gas, are carried on outside of the colony. Under this section of the lecture, the utilisation of shale, slate debris, slag, alkali waste, coal tar and the various complex products obtained from it, were dealt with, the methods by which they were rendered of use and their importance being brought into prominence. The consideration of the utilisation of waste produced

locally was then entered upon, reference being made to the manufacture of rum from molasses ; paper from megass ; oxalic acid, gas and various compounds from sawdust ; and cocoanut oil, fibre and oil cake from cocoanuts. The important applications and the usefulness of slaughter house refuse in the shape of hides, horns, bones, blood and other offal, and the various forms of city refuse, were next discussed ; and the methods pointed out by which what is now considered and treated as rubbish might be utilised and made a source of wealth to the community. Brief mention was made of the undeveloped resources of the colony such as waste lands, fibres of various sorts, and other natural products awaiting utilisation. In order to do away with the large annual imports of leather, the establishment of tanneries was advocated to work up all the hides stripped within the colony, where numerous and valuable tanning material can be had close at hand. Special reference was made to the small tannery which is at present the only one in existence in the colony, situated at Albouy's Town on the outskirts of the city, in which some excellent leather is prepared, the tanning material used being the bark of the wild mangrove obtained from the Essequibo River.

The lecture was illustrated by diagrams and experiments, and prepared specimens of the various articles referred to.

ERRATA.

On page 340, line 24, for *King* of Holland, read *States General*.

On page 341, line 2, for *Sovereign* read *Stadtholder*.

On page 365, line 26, for *Ardea cocoi* ?, read *Ciconia maguari*.
